

ENVIRONMENTAL ANALYSIS

FOR THE

COOK MOUNTAIN SALVAGE SALES AREA

PREPARED BY

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Plains Unit, Northwestern Land Office

Montana Department of Natural Resources and Conservation

October 9, 2007

Table of Contents

Objectives Memo	3
Checklist Environmental Assessment	4
Attachment I: Area Maps and Project Plan	13
Attachment II: Resource Analysis	32
• Vegetation Analysis	34
• Hydrology/Fisheries Analysis	42
• Soils Analysis	50
• Wildlife Analysis	57
• Archeology Analysis	78
Attachment III: Prescriptions	79
Attachment IV: Mitigations	102
Attachment V: Consultants and References	105

MEMORANDUM

To: Dave Olsen

From: Larry Ballantyne, Plains Unit Manager, MT DNRC

Subject: Chippy Creek Fire Salvage

Date: September 17, 2007

Primary Objective:

The primary objective of fire salvage operations following the Chippy Creek Fire is to effectively recover value of timber killed, damaged, or otherwise injured during the fire event of August/September 2007. Loss to the associated trusts is to be minimized. Administrative rules as applicable to salvage operations shall be applied to this project.

Secondary Objective:

The secondary objective for this project is to promote timber regeneration and vegetative recovery on Trust lands burned in the fire event. Measures to promote natural regeneration as well as tree planting will be addressed in prescriptions for this project.

CHECKLIST ENVIRONMENTAL ASSESSMENT

Project Name:	Cook Mountain Fire Salvage
Proposed Implementation Date:	November 21, 2007
Proponent:	Department of Natural Resources and Conservation, Northwest Land Office, Plains Unit
Location:	Sections 6,16, 20, and 28, Township 23 North, Range 26 West Section 36, Township 24 North, Range 27 West
County:	Sanders

I. TYPE AND PURPOSE OF ACTION

The Department of Natural Resources and Conservation (DNRC) proposes to sell approximately 56,000 tons (8.0 MMBF) of salvage timber in the Thompson River Drainage, Sections 6,16, 20, 28 Township 23N, Range 26W, and Section 36, Township 24N, Range 27W, 19 air miles north of Plains, Montana. This action would produce estimated revenue of \$ 800,000.00 for the Common Schools (C. S.) and \$ 800,000.00 for the Public Buildings (P. B.) Trust Grants. Under the proposed action, DNRC would salvage timber affected by the Chippy Creek Fire, reduce excessive fuel loading and the related risk of wildfire, reduce insect infestations and promote timber types historically found in the area, maintain and improve forest health, and increase forest productivity beneficial to future trust actions (See Attachment 1, Area Maps and Project Plan). Salvage timber would most likely be sold under two separate timber sales, Cooked Mountain Salvage and Seared Gulch Salvage. If the Action Alternative is selected, activities would begin November 21, 2007.

In addition to timber harvesting, approximately 2.75 miles of new road would be constructed, 2.3 miles of road would be reconstructed and approximately 24 miles of road would be maintained or have minor drainage improvements installed as necessary to meet Best Management Practices (BMPs). A "keyhole" truck-turnaround will be constructed on State lands in Section 26, Township 23N, R27W to facilitate hauling south on the County Road, Road #7512, over Loneman Divide (See Attachment 1, Area Maps and Project Plan). The turnaround would require approximately 200 tons of fill material from the existing Sears Gulch gravel pit.

The proposed Cooked Mountain Salvage Timber Sale would include the following Common Schools (C. S.) Trust Sections and units:

- Five units in Section 16, T23N, R26W totaling approximately 511 acres are proposed. The project would require the construction of approximately 1.5 miles of new road and the reconditioning and upgrading of approximately 2.5 miles of existing roads.
- One unit totaling 30 acres in Section 6, T23N, R26W is proposed. No new road would be constructed.
- One unit totaling 25 acres in Section 36, T24N, R27W is proposed. No new road would be constructed.

The proposed Seared Gulch Salvage Timber Sale would include the following Public Buildings (P. B.) Trust Sections and units:

- One unit in Section 20, T23N, R26W totaling 310 acres is proposed. Approximately 3.0 miles of road would be upgraded. No new road construction would be required in this unit.
- Three units totaling 254 acres in Section 28, T23N, R26W are proposed which would require approximately 2.0 mile of new road construction and the reconstruction of approximately 3.0 miles of existing road.

Lands involved in this proposed project are held by the State of Montana in trust for the support of specific beneficiary institutions such as the public buildings trust, public schools, state colleges, universities, and other state institutions (Enabling Act of February 22, 1889; 1972 Montana Constitution, Article X Section 11). The Board of Land Commissioners and the Department of Natural Resources and Conservation are required, by law, to administer these trust lands to produce the largest measure of reasonable and legitimate return over the long run for these beneficiary institutions (Section 77-1-202, MCA). The DNRC would manage lands involved in this project in accordance with the State Forest Land Management Plan (DNRC 1996) and the Administrative Rules for Forest Management (ARM 36.11.401 through 450) as well as other applicable state and federal laws.

II. PROJECT DEVELOPMENT

1. PUBLIC INVOLVEMENT, AGENCIES, GROUPS OR INDIVIDUALS CONTACTED:

Provide a brief chronology of the scoping and ongoing involvement for this project.

This project has been developed in response to the Chippy Creek Fire of August, 2007. Public involvement has been solicited through newspaper advertisements and through letters sent to adjacent landowners and other known interested parties and organizations. Public response was received and used to assist in identifying issues surrounding the proposed project. Hydrological, soils, wildlife and vegetative concerns were identified by DNRC specialists and field foresters for both the No-Action and the Action Alternatives. Issues and concerns have been resolved or mitigated through project design and/or would be included as specific contractual requirements of the project. Recommendations to minimize direct, indirect, and cumulative impacts have been incorporated in the project design (see Attachment I, Area Maps and Project Plan; Attachment II, Resource Analyses; Attachment III, Prescriptions; Attachment IV, Mitigations; Attachment V, Consultants and References).

2. OTHER GOVERNMENTAL AGENCIES WITH JURISDICTION, LIST OF PERMITS NEEDED:

The DNRC has an existing Reciprocal Access Agreement with Plum Creek Marketing Inc. in the Lower Thompson drainage through the Cook Mountain, Stobie-Marten Creek and Lower Thompson Reciprocal Access Agreements (Lower Thompson RECIP). The DNRC maintains a Temporary Road Use Agreement on the ACM Road # 56 with Plum Creek Marketing. An Alternative Practice will be applied for to allow mechanized harvest activity during the black back woodpecker nesting period from April 15 to July 1 (See Attachment II, Resource Analysis; Wildlife Analysis).

3. ALTERNATIVES CONSIDERED:

No Action: Under the No Action alternative, no activity would be undertaken. No salvage timber would be harvested and no road construction or improvements would occur.

Action: The Action Alternative is shown in Section 1, Type and Purpose of Action. No other action alternatives were identified during project scoping or analysis; therefore only forest product removal and sale are analyzed in the EA Checklist.

III. IMPACTS ON THE PHYSICAL ENVIRONMENT
<ul style="list-style-type: none">• <i>RESOURCES potentially impacted are listed on the form, followed by common issues that would be considered.</i>• <i>Explain POTENTIAL IMPACTS AND MITIGATIONS following each resource heading.</i>• <i>Enter "NONE" if no impacts are identified or the resource is not present.</i>

4. GEOLOGY AND SOIL QUALITY, STABILITY AND MOISTURE:

Consider the presence of fragile, compactable or unstable soils. Identify unusual geologic features. Specify any special reclamation considerations. Identify any cumulative impacts to soils.

Recommendations from a DNRC specialist to minimize direct, indirect, and cumulative impacts have been incorporated in the project design. (Attachment I, Area Maps and Project Plan; Attachment II, Resource Analyses, Soils Analysis; Attachment III, Prescriptions; Attachment IV, Mitigations). As detailed in the Soils Analysis, no substantial direct, indirect or cumulative impacts to soils resources are expected to result from the implementation of the Action Alternative.

5. WATER QUALITY, QUANTITY AND DISTRIBUTION:

Identify important surface or groundwater resources. Consider the potential for violation of ambient water quality standards, drinking water maximum contaminant levels, or degradation of water quality. Identify cumulative effects to water resources.

A DNRC hydrologist has reviewed the project area, transportation system and harvest plan. Recommendations to minimize impacts have been incorporated into the project design (See Attachment II, Resource Analyses, Hydrology and Fisheries Analysis/Soils Analysis; Attachment IV Mitigations). As detailed in the Hydrology and Fisheries Analysis, no substantial direct, indirect or cumulative impacts to water quality, water quantity or downstream beneficial uses are expected to result from the implementation of the Action Alternative.

6. AIR QUALITY:

What pollutants or particulate would be produced? Identify air quality regulations or zones (e.g. Class I air shed) the project would influence. Identify cumulative effects to air quality.

The project is located in Montana State Airshed 2; it is not within a Class 1 Airshed. Some particulate matter would be introduced into the Airshed from the burning of logging slash. Impacts are expected to be minor and temporary with slash burning to be conducted when conditions favor good to excellent smoke dispersion. All burning would be conducted during times of adequate ventilation within the existing rules and regulations.

7. VEGETATION COVER, QUANTITY AND QUALITY:

What changes would the action cause to vegetative communities? Consider rare plants or cover types that would be affected. Identify cumulative effects to vegetation.

The Chippy Creek Fire has begun to move these stands towards historic desired cover types. Silvicultural prescriptions have been developed to remove the dead and dying trees, determined by bole char, percentage of crown scorching and root damage, as a result of fire as well as diseased, insect infested timber species. Recommendations to minimize direct, indirect and cumulative impacts have been incorporated in the project design (see Attachment I, Area Maps and Project Plan: Attachment II, Resource Analyses, Vegetation Analysis, Attachment III, Prescriptions; Attachment IV, Mitigations). Approximately 24 acres would be removed from timber production to create road access into the sale area. No old growth stands as defined by Green (1992) are present in the project area; therefore the action alternative would not affect old growth. No sensitive plants listed by the Montana Natural Heritage Program have been identified in the project area. Measures to minimize noxious weeds, insects and disease are included in the project design. (see Attachment IV, Mitigations).

8. TERRESTRIAL, AVIAN AND AQUATIC LIFE AND HABITATS:

Consider substantial habitat values and use of the area by wildlife, birds or fish. Identify cumulative effects to fish and wildlife.

Recommendations from DNRC specialists to minimize direct, indirect, and cumulative impacts have been incorporated in the project design. (Attachment I, Area Maps and Project Plan: Attachment II, Resource Analyses, Wildlife Analysis / Hydrology and Fisheries Analysis: Attachment III, Prescriptions: Attachment IV, Mitigations). As detailed in the Wildlife Analysis and the Hydrology and Fisheries Analysis, no substantial direct, indirect or cumulative impacts to terrestrial, avian and aquatic species and habitats are expected to result from the implementation of the Action Alternative.

9. UNIQUE, ENDANGERED, FRAGILE OR LIMITED ENVIRONMENTAL RESOURCES:

Consider any federally listed threatened or endangered species or habitat identified in the project area. Determine effects to wetlands. Consider Sensitive Species or Species of special concern. Identify cumulative effects to these species and their habitat.

Recommendations from DNRC specialists to minimize direct, indirect, and cumulative impacts have been incorporated in the project design. (Attachment I, Area Maps and Project Plan: Attachment II, Resource Analyses, Wildlife Analysis / Hydrology and Fisheries Analysis: Attachment III, Prescriptions: Attachment IV, Mitigations). As detailed in the Wildlife Analysis and the Hydrology and Fisheries Analysis, no substantial direct, indirect or cumulative impacts to unique, endangered, fragile or limited environmental resources are expected to result from the implementation of the Action Alternative.

10. HISTORICAL AND ARCHAEOLOGICAL SITES:

Identify and determine effects to historical, archaeological or paleontological resources.

A DNRC archeologist has reviewed this project. Significant sites or artifacts were not identified during these reviews. (See Attachment II, Resource Analyses, Archeologist findings (P. Rennie, DNRC, e-mail communication)).

11. AESTHETICS:

Determine if the project is located on a prominent topographic feature, or may be visible from populated or scenic areas. What level of noise, light or visual change would be produced? Identify cumulative effects to aesthetics.

Portions of the project would be visible from the ACM Road however the area has largely been burned. The ACM Road in this area is owned by Plum Creek Lumber Company and used for mainly timber harvesting operations, however Plum Creek does allow the road to be open for public use at this time. Openings or disturbance from skyline corridors and skid trails are currently visible, however changes in tree cover density would be mostly negligible due the loss of canopy cover from the fire. The harvest prescriptions, the use of skyline yarding systems, and the inclusion of a buffer strip along the main roads, where it is possible, should minimize the visual impacts. (See Attachment IV, Mitigations).

12. DEMANDS ON ENVIRONMENTAL RESOURCES OF LAND, WATER, AIR OR ENERGY:

Determine the amount of limited resources the project would require. Identify other activities nearby that the project would affect. Identify cumulative effects to environmental resources.

No direct, indirect, or cumulative impacts would likely occur under either alternative.

13. OTHER ENVIRONMENTAL DOCUMENTS PERTINENT TO THE AREA:

List other studies, plans or projects on this tract. Determine cumulative impacts likely to occur as a result of current private, state or federal actions in the analysis area, and from future proposed state actions in the analysis area that are under MEPA review (scoped) or permitting review by any state agency.

Big Prairie Timber Sale EA, 2004. Timber Sale proposed and implemented from 2004-2007. Activities included timber harvest, road construction, road reconstruction and road decommissioning. Future activities include precommercial thinning and tree planting.

Cook-Bear Timber Sale EA, 1997. Timber Sale proposed and implemented from 1997-1999. Activities included timber harvest, road construction, road reconstruction and road decommissioning.

U.S. Forest Service, Lolo National Forest, Plains/Thompson Falls Ranger District
(Scheduled of Proposed Actions in the Thompson River drainage area 07/01/2007 – 09/30/2007)

Fishtrap — The Lolo National Forest is proposing a list of forest management activities in Township 24 North Range 28 West. Activities would include: timber harvest, precommercial thinning, road reconstruction, allotment abandonment, ecosystem management burning, and road decommissioning. Activities are proposed to begin in July 2008.

IV. IMPACTS ON THE HUMAN POPULATION

- *RESOURCES* potentially impacted are listed on the form, followed by common issues that would be considered.
- Explain *POTENTIAL IMPACTS AND MITIGATIONS* following each resource heading.
- Enter "NONE" if no impacts are identified or the resource is not present.

14. HUMAN HEALTH AND SAFETY:

Identify any health and safety risks posed by the project.

Human health would not be impacted by the proposed timber sale or associated activity. There are no unusual safety considerations associated with the proposed timber sale.

15. INDUSTRIAL, COMMERCIAL AND AGRICULTURE ACTIVITIES AND PRODUCTION:

Identify how the project would add to or alter these activities.

Timber harvest would provide continuing industrial production in the Plains area.

16. QUANTITY AND DISTRIBUTION OF EMPLOYMENT:

Estimate the number of jobs the project would create, move or eliminate. Identify cumulative effects to the employment market.

People are currently employed in the wood products industry in the region. Due to the relatively small size of the timber sale program, there would be no measurable direct, indirect, or cumulative impacts from this proposed action.

17. LOCAL AND STATE TAX BASE AND TAX REVENUES:

Estimate tax revenue the project would create or eliminate. Identify cumulative effects to taxes and revenue.

People are currently paying taxes from the wood products industry in the region. Due to the relatively small size of the timber sale, there would be no measurable direct, indirect, or cumulative impacts from this proposed action on tax revenues.

18. DEMAND FOR GOVERNMENT SERVICES:

Estimate increases in traffic and changes to traffic patterns. What changes would be needed to fire protection, police, schools, etc.? Identify cumulative effects of this and other projects on government services

Log trucks hauling to the purchasing mill would result in temporary increases in traffic on Road # 7512 (County Road), Highway 200 and the ACM Road # 56. This increase is a normal contributor to the activities of the local community and industrial base and cannot be considered a new or increased source.

19. LOCALLY ADOPTED ENVIRONMENTAL PLANS AND GOALS:

List State, County, City, USFS, BLM, Tribal, and other zoning or management plans, and identify how they would affect this project.

On June 17, 1996, the Land Board approved the State Forest Land Management Plan (SFLMP). The SFLMP provides the philosophy adopted by DNRC through programmatic review (DNRC, 1996). The DNRC will manage the lands in this project according to this philosophy, which states:

Our premise is that the best way to produce long-term income for the trust is to manage intensively for healthy and biological diverse forests. Our understanding is that a diverse forest is a stable forest that will produce the most reliable and highest long-term revenue stream... In the foreseeable future, timber management will continue to be our primary source of revenue and our primary tool for achieving biodiversity objectives.

On March 13, 2003, the DNRC adopted Administrative Rules for Forest Management (Rules) (Administrative Rules of Montana [ARM] 36.11.401 through 450). The Rules provide DNRC personnel with consistent policy, direction, and guidance for the management of forested trust lands. Together, the SFLMP and Rules define the programmatic framework for this project.

20. ACCESS TO AND QUALITY OF RECREATIONAL AND WILDERNESS ACTIVITIES:

Identify any wilderness or recreational areas nearby or access routes through this tract. Determine the effects of the project on recreational potential within the tract. Identify cumulative effects to recreational and wilderness activities.

The area is hunted frequently. Roads through the area that would be closed after the project only access the immediate area, therefore closure of them would not affect the ability of people to recreate on these parcels. The DNRC has cabin site leases in the vicinity of the project area. None of the cabin sites would be directly involved in any of the proposed actions. Recreational areas and wilderness are not accessed through this tract. Use is expected to remain the same following this project.

21. DENSITY AND DISTRIBUTION OF POPULATION AND HOUSING:

Estimate population changes and additional housing the project would require. Identify cumulative effects to population and housing.

There would be no measurable direct, indirect, or cumulative impacts related to population and housing due to the relatively small size of the timber sale, and the fact that people are already employed in this occupation in the region.

22. SOCIAL STRUCTURES AND MORES:

Identify potential disruption of native or traditional lifestyles or communities.

No direct, indirect, or cumulative impacts related to social structures and mores would be expected under either alternative.

23. CULTURAL UNIQUENESS AND DIVERSITY:

How would the action affect any unique quality of the area?

No direct, indirect, or cumulative impacts related to cultural uniqueness and diversity would be expected under either alternative.

24. OTHER APPROPRIATE SOCIAL AND ECONOMIC CIRCUMSTANCES:

Estimate the return to the trust. Include appropriate economic analysis. Identify potential future uses for the analysis area other than existing management. Identify cumulative economic and social effects likely to occur as a result of the proposed action.

Costs, revenues and estimates of return are estimates intended for relative comparison of alternatives. They are not intended to be used as absolute estimates of return. The estimated stumpage is based on comparable sales analysis. This method compares recent sales to find a market value for stumpage. These sales have similar species, quality, average diameter, product mix, terrain, date of sale, distance from mills, road building and logging systems, terms of sale, or anything that could affect a buyer's willingness to pay for. The Action Alternative would generate an estimated return to the school trusts of \$1,700,000.00. The No Action Alternative would not generate any return to the school trusts at this time.

EA Checklist Prepared By:	Name: David Olsen Title: Forest Management Supervisor	Date: 11-2-2007
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V. FINDING

25. ALTERNATIVE SELECTED: The Action Alternative is selected for implementation

26. SIGNIFICANCE OF POTENTIAL IMPACTS: Impacts surrounding implementation of the action alternative have been mitigated or addressed through alternative practice as defined in the Environmental Analysis.

27. NEED FOR FURTHER ENVIRONMENTAL ANALYSIS:

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EIS

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More Detailed EA

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No Further Analysis

EA Checklist Approved By:	Name: Larry Ballantyne
	Title: Resource Program Manager, Plains Unit, MT DNRC
Signature: <i>L. Ballantyne</i>	Date: <i>10/30/2007</i>

Attachment I

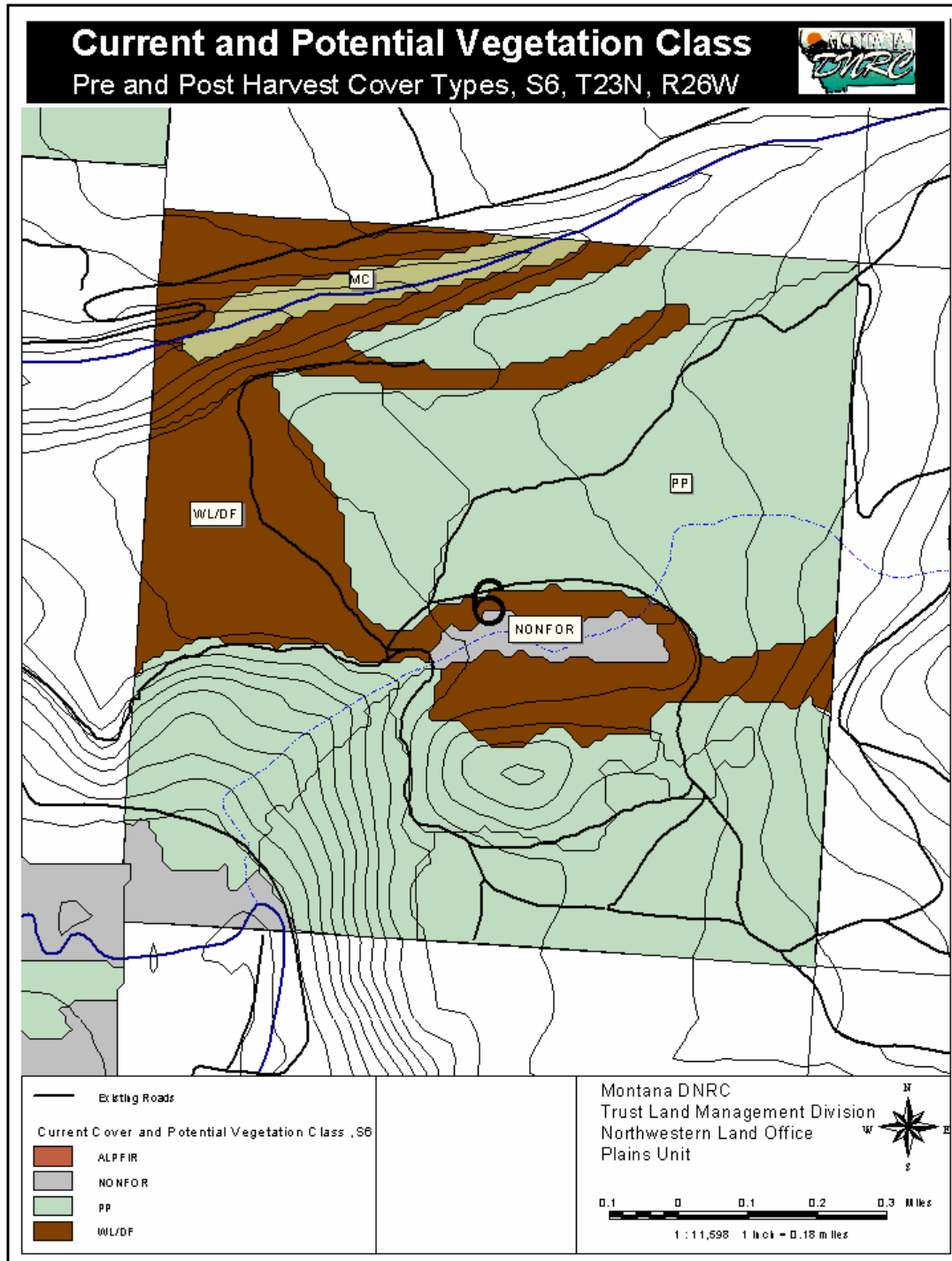
Area Maps and Project Plan

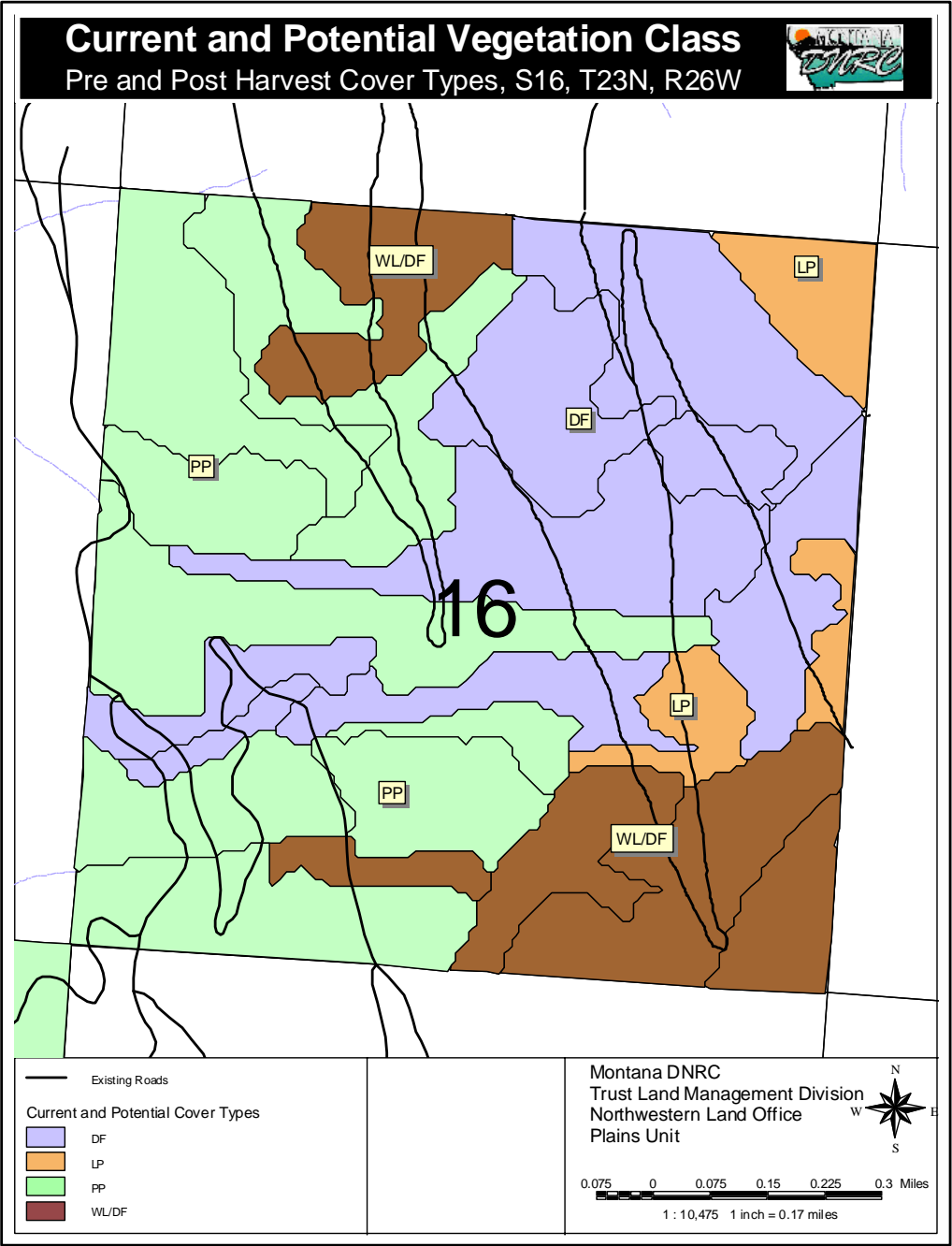
Sale & Access Maps

Harvest Units and Travel Plan Maps

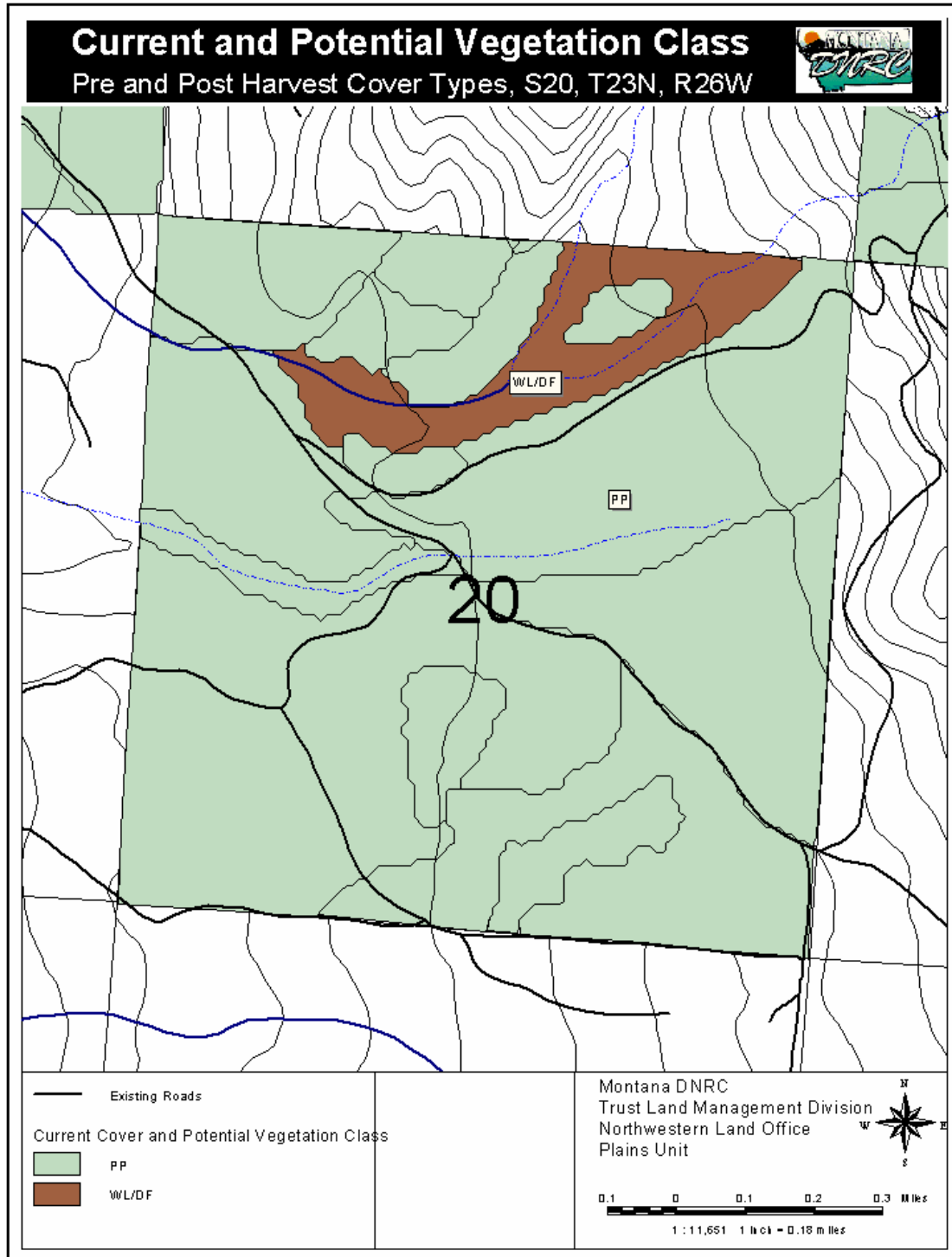
Current and Potential Vegetation Cover Types Maps

Fire Intensity Maps

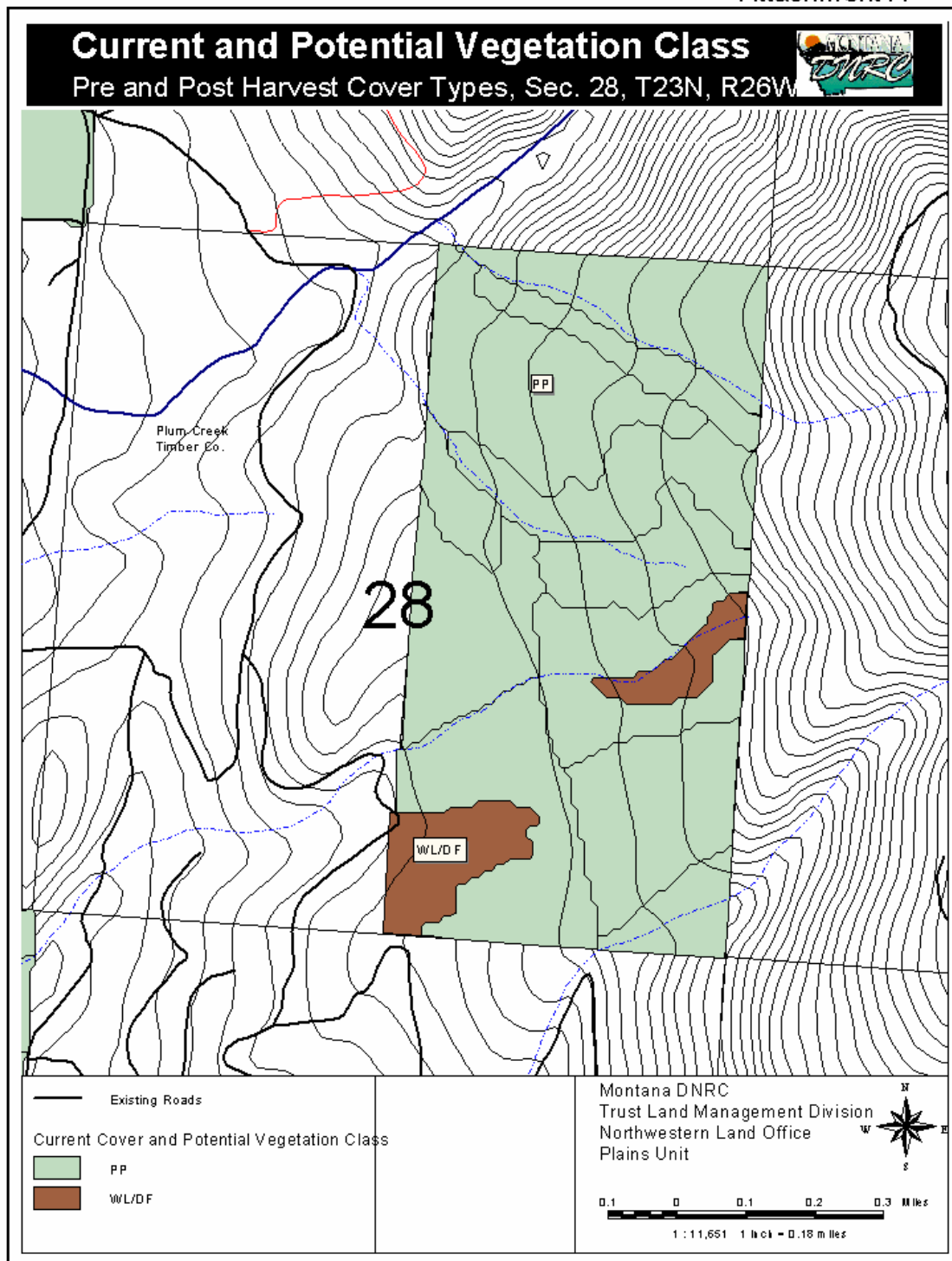


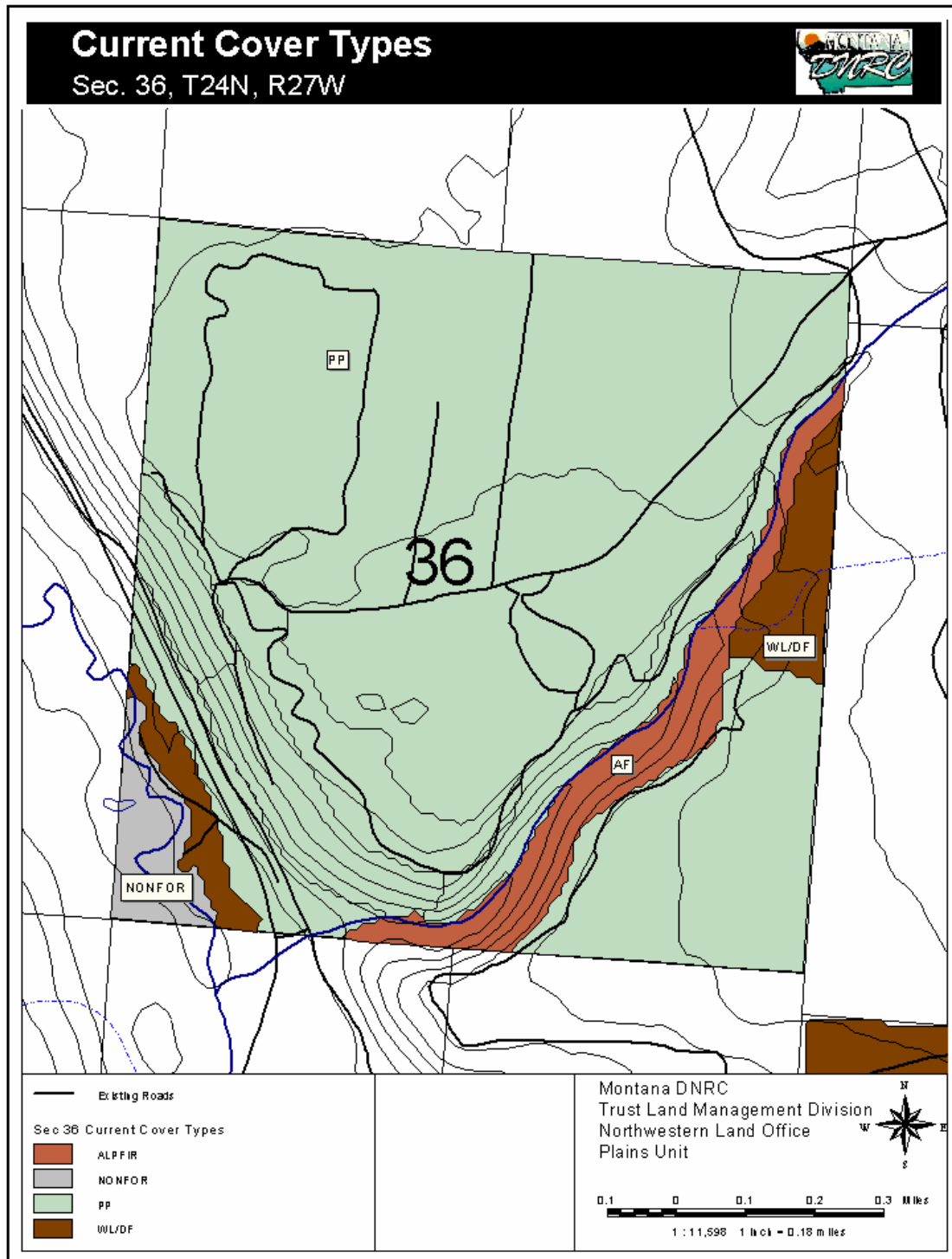


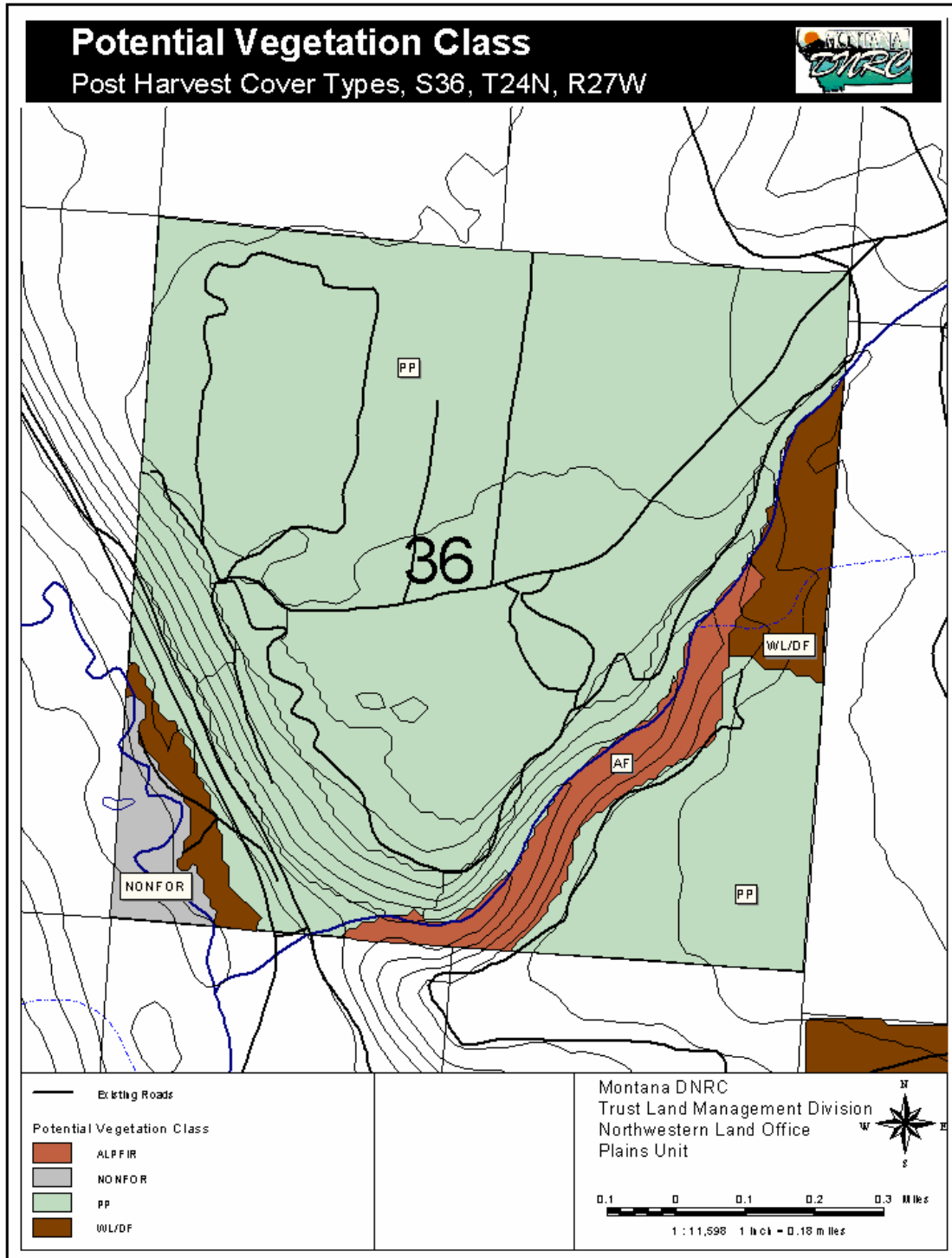
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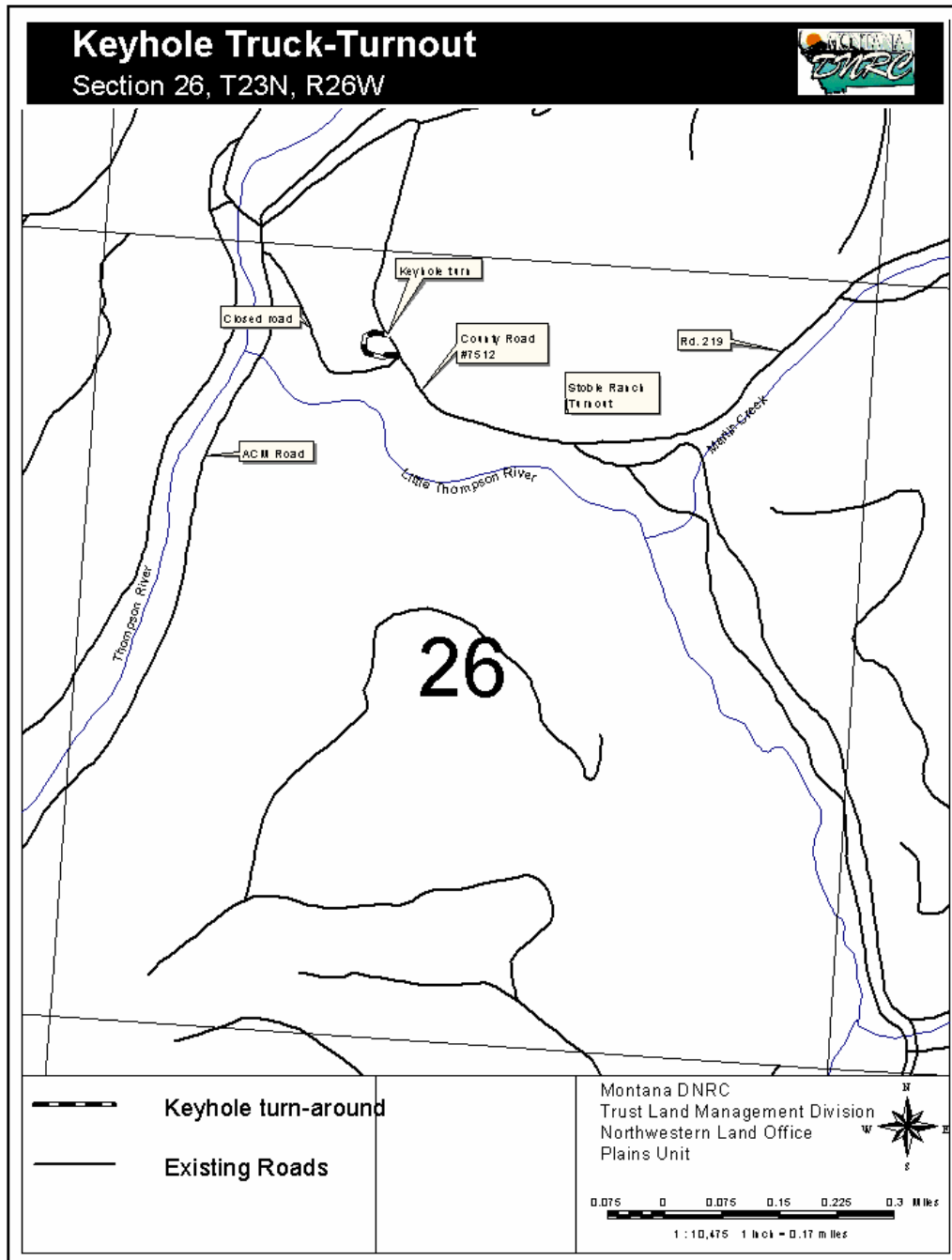
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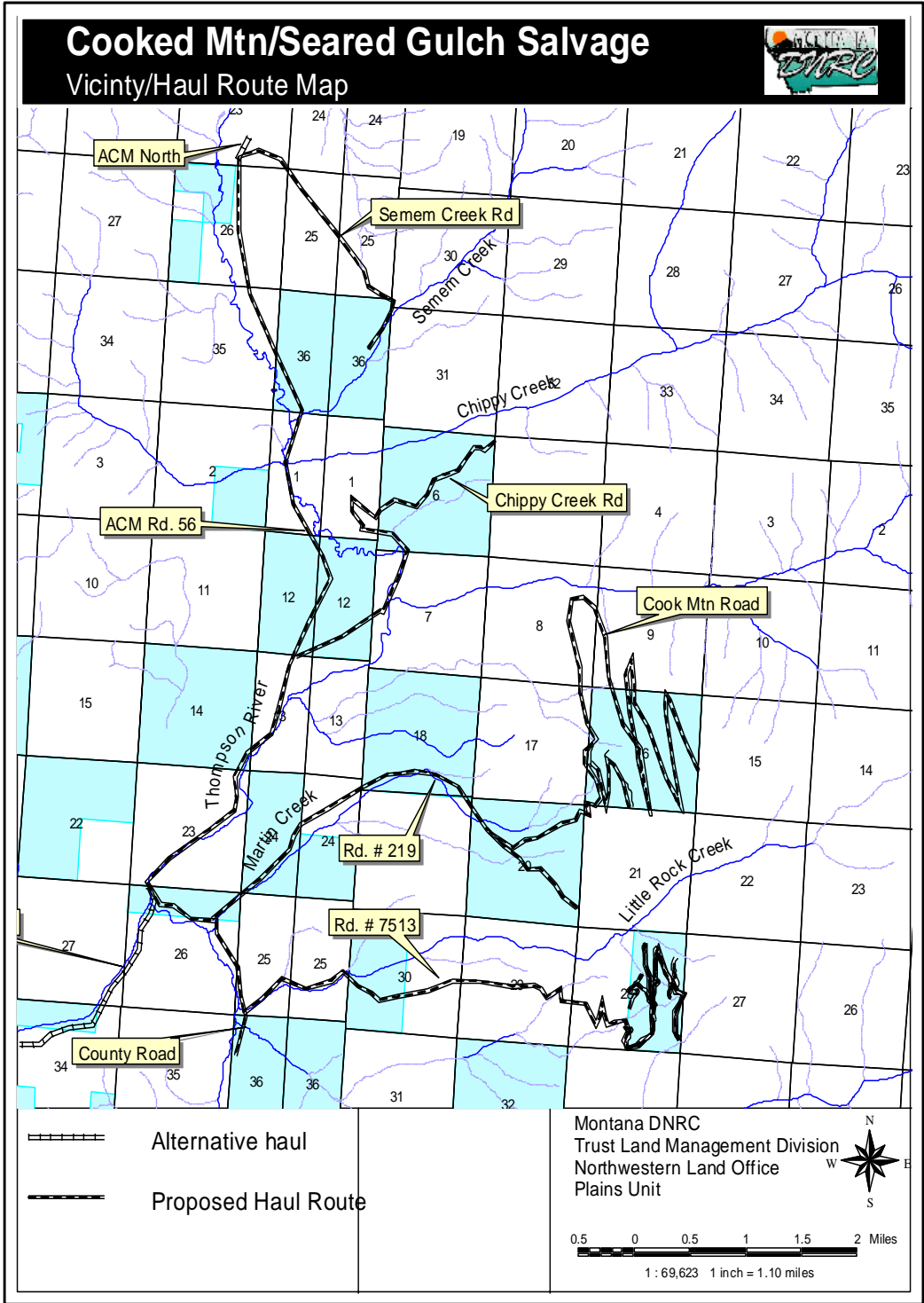




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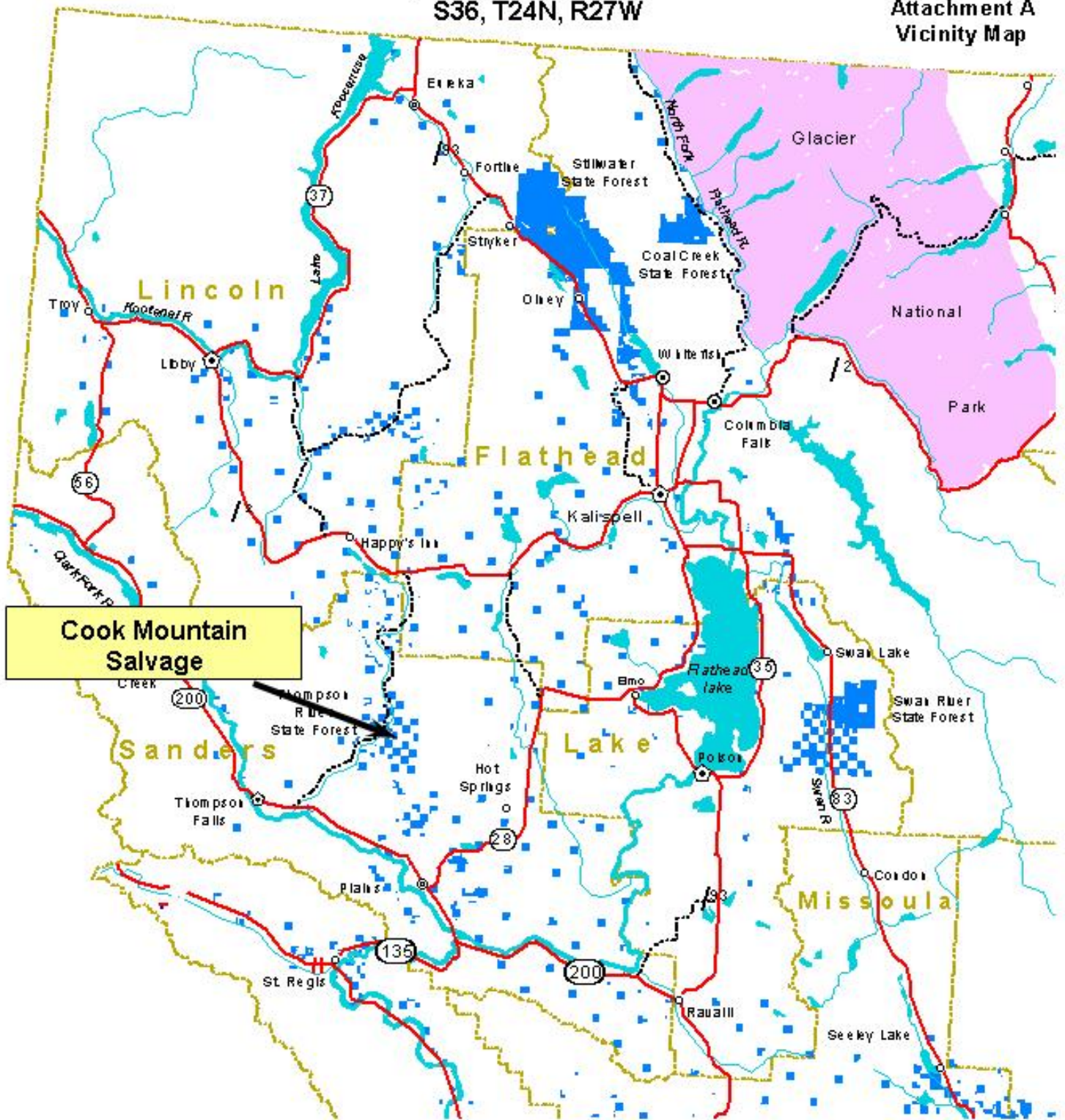


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Cook Mountain Salvage
S 6, 16, 20, 28, T23N, R26W
S36, T24N, R27W

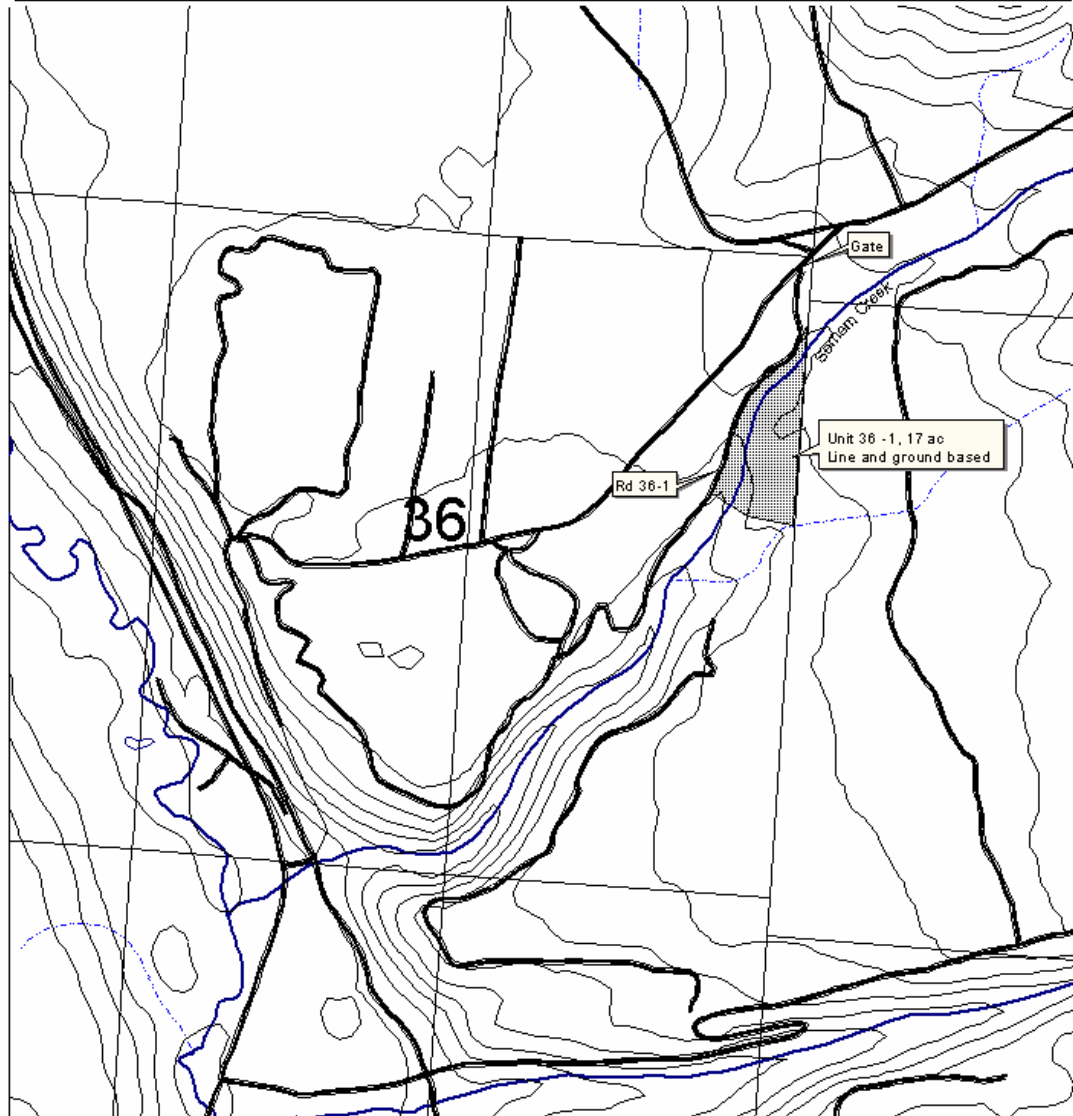
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Vicinity Map


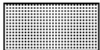


- Highways
- Other Roads
- County line
- Lakes
- Streams
- State Land

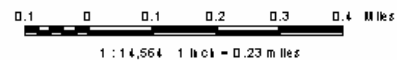
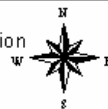
Cooked Mountain Salvage, Harvest Plan

Sec. 36, T24N, R27W

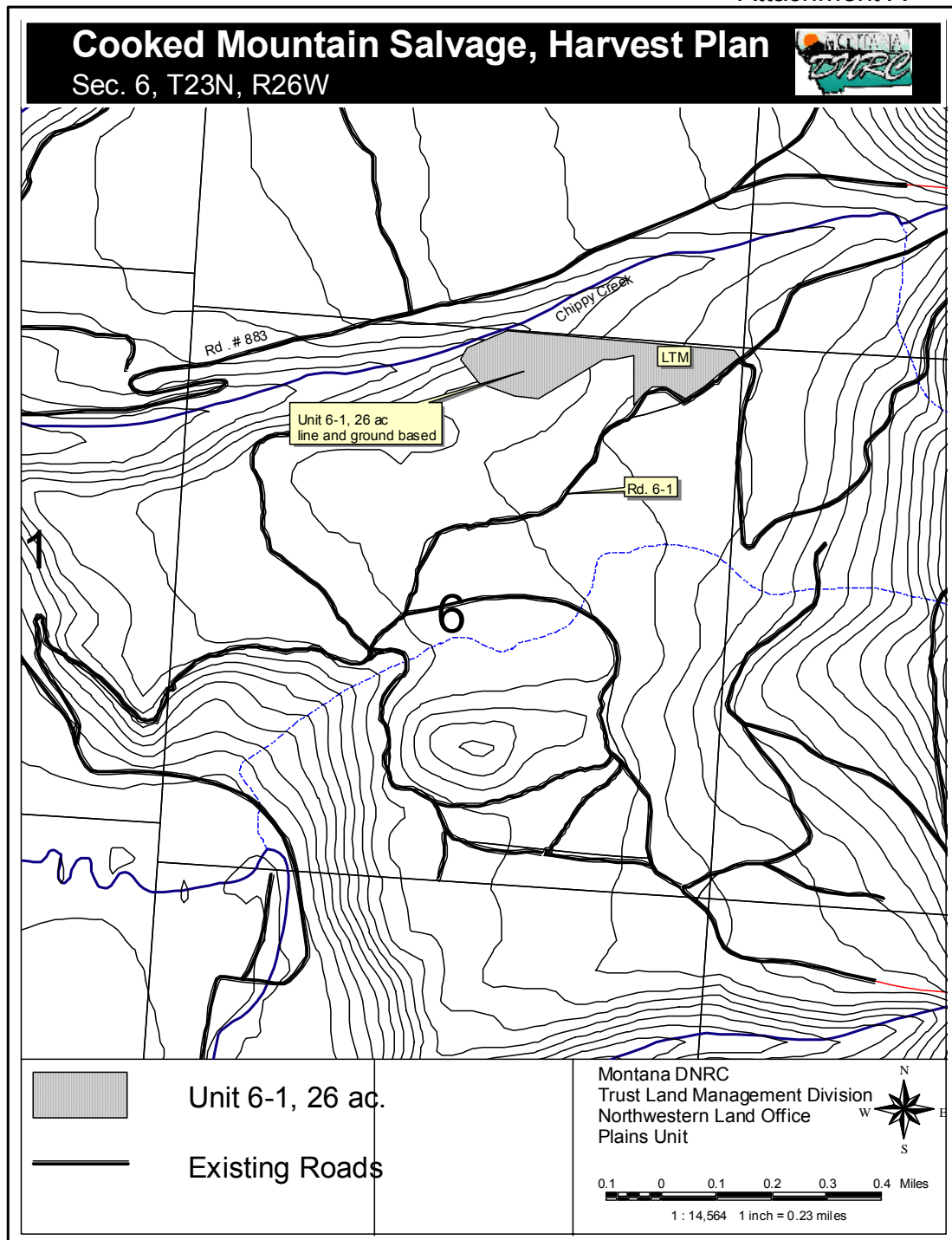


-  Existing Roads
-  Unit 36-1, 17 acres

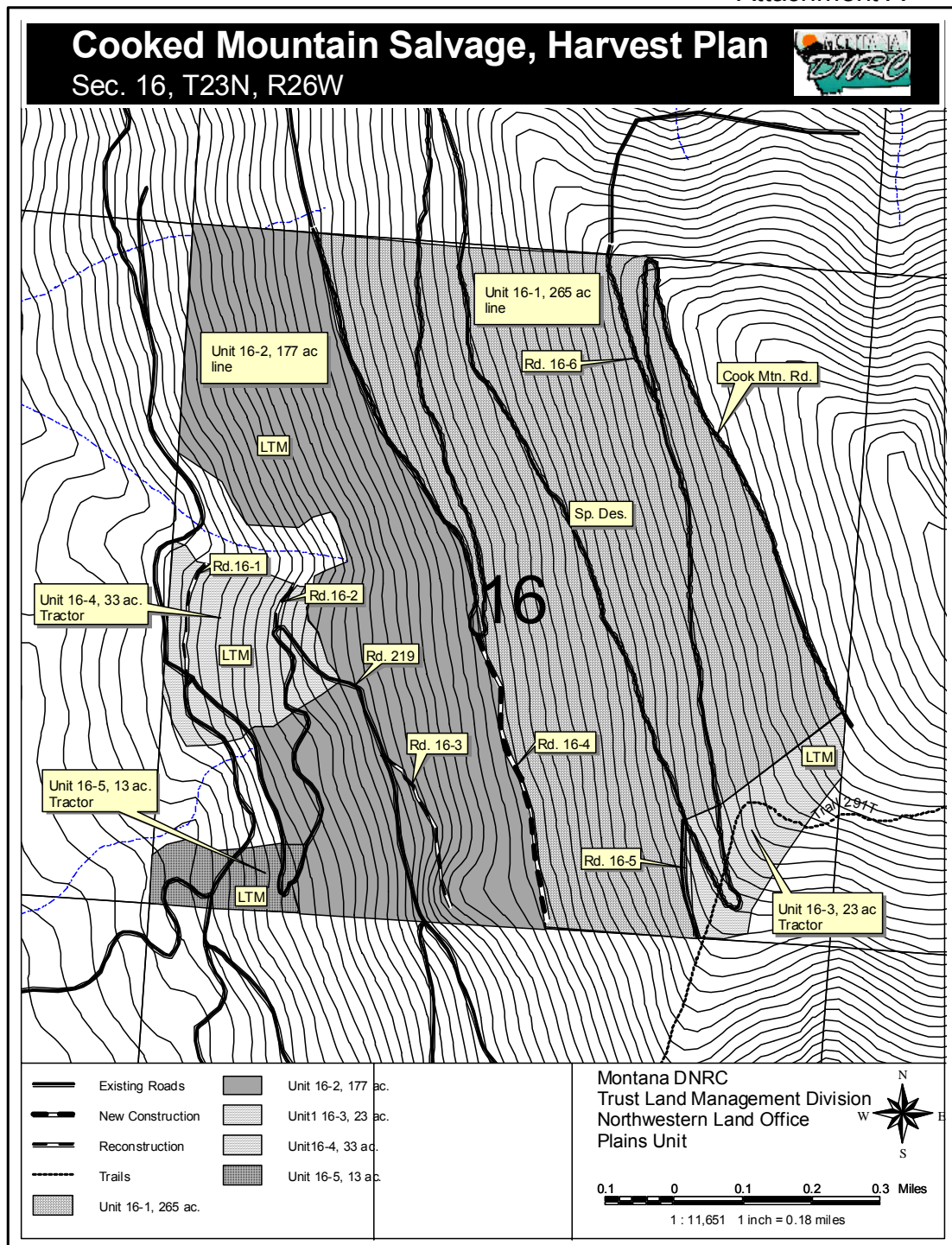
Montana DNRC
Trust Land Management Division
Northwestern Land Office
Plains Unit



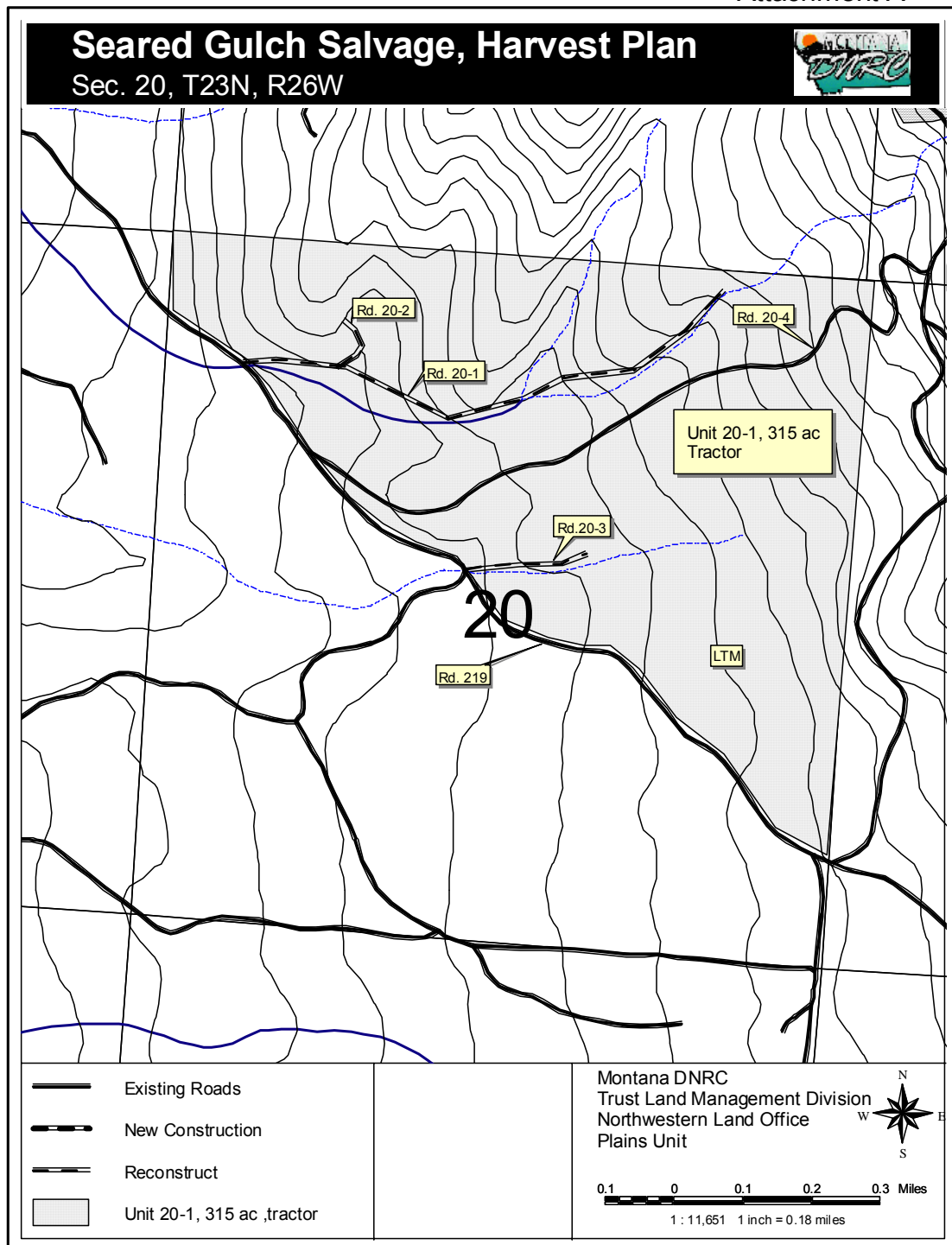
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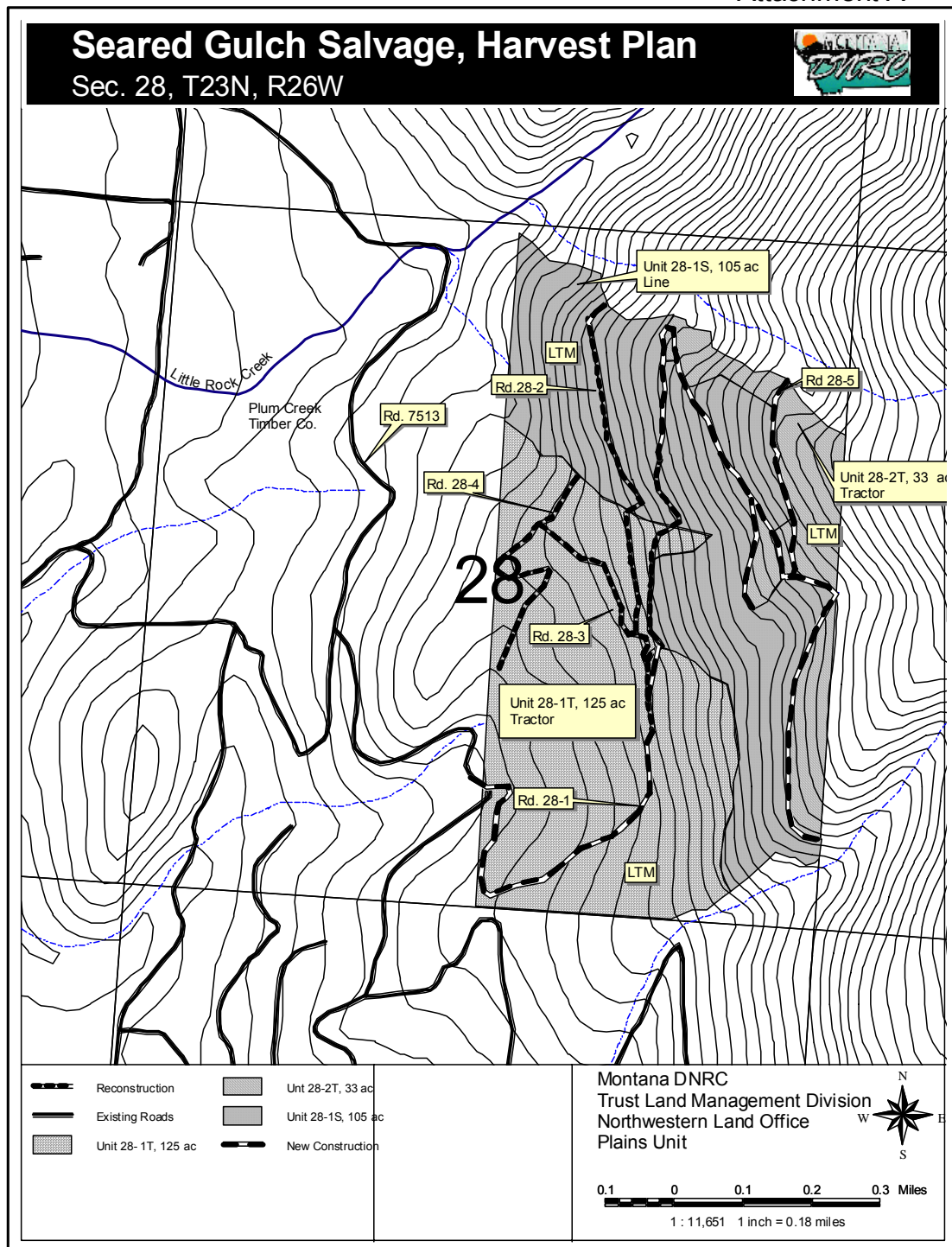
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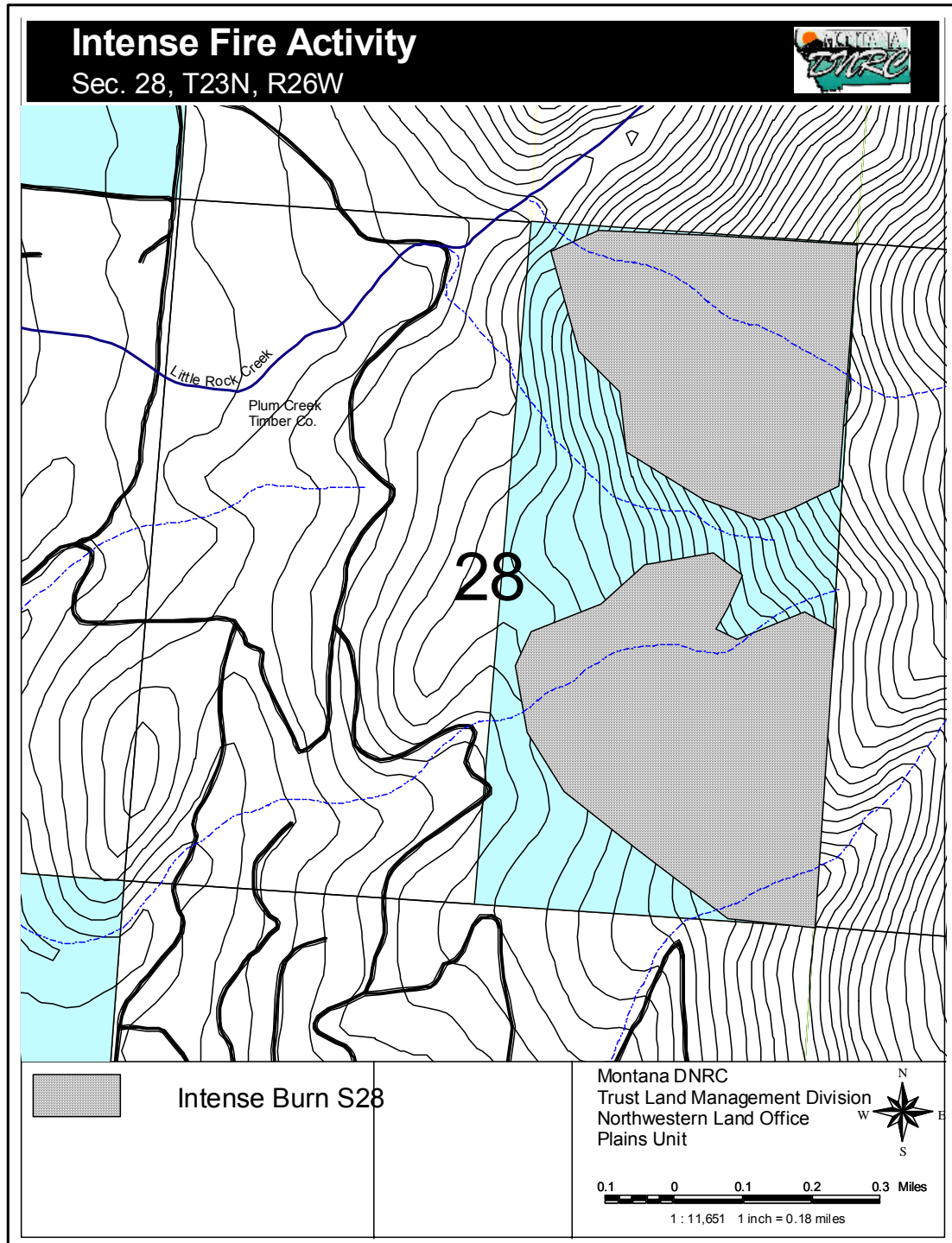
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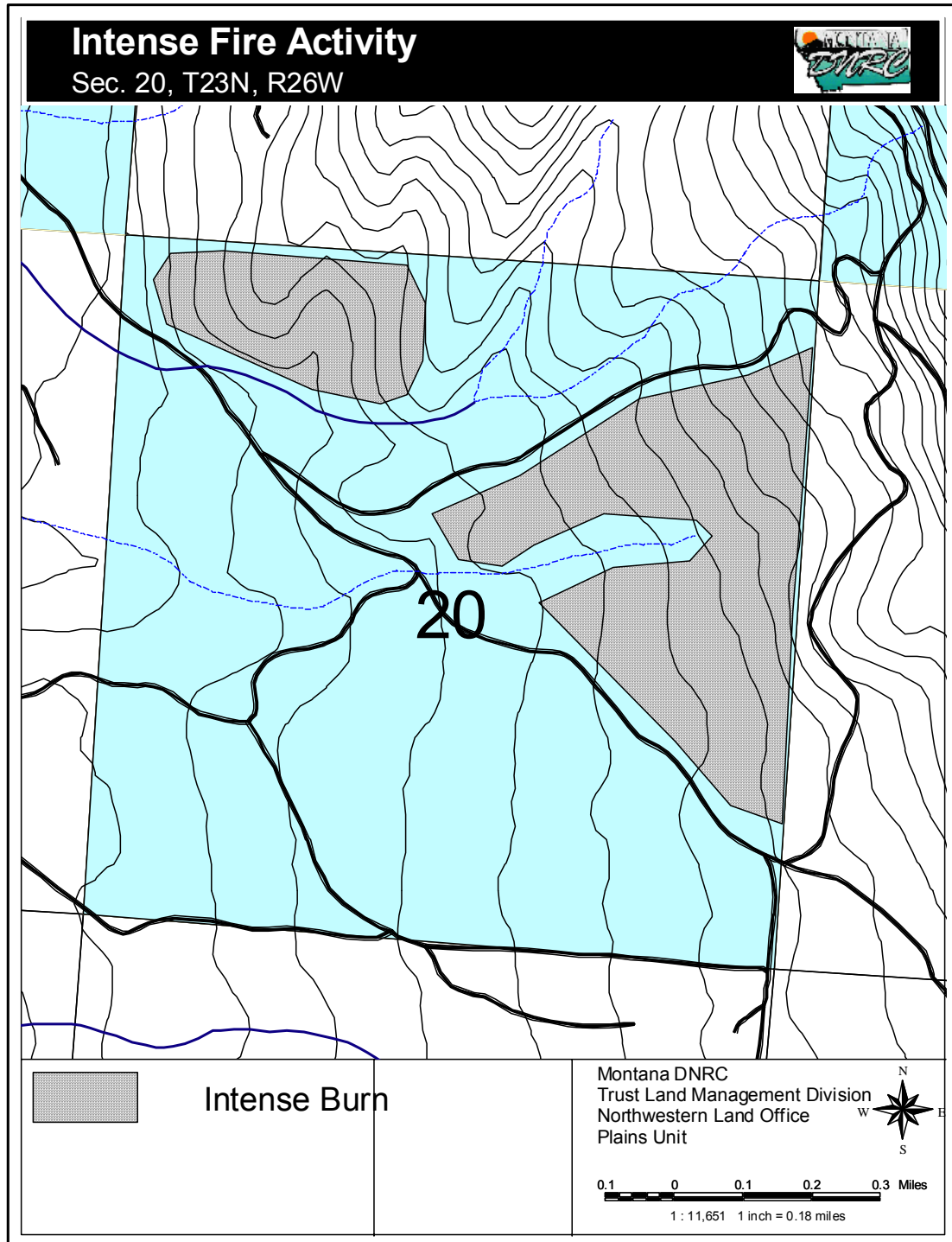
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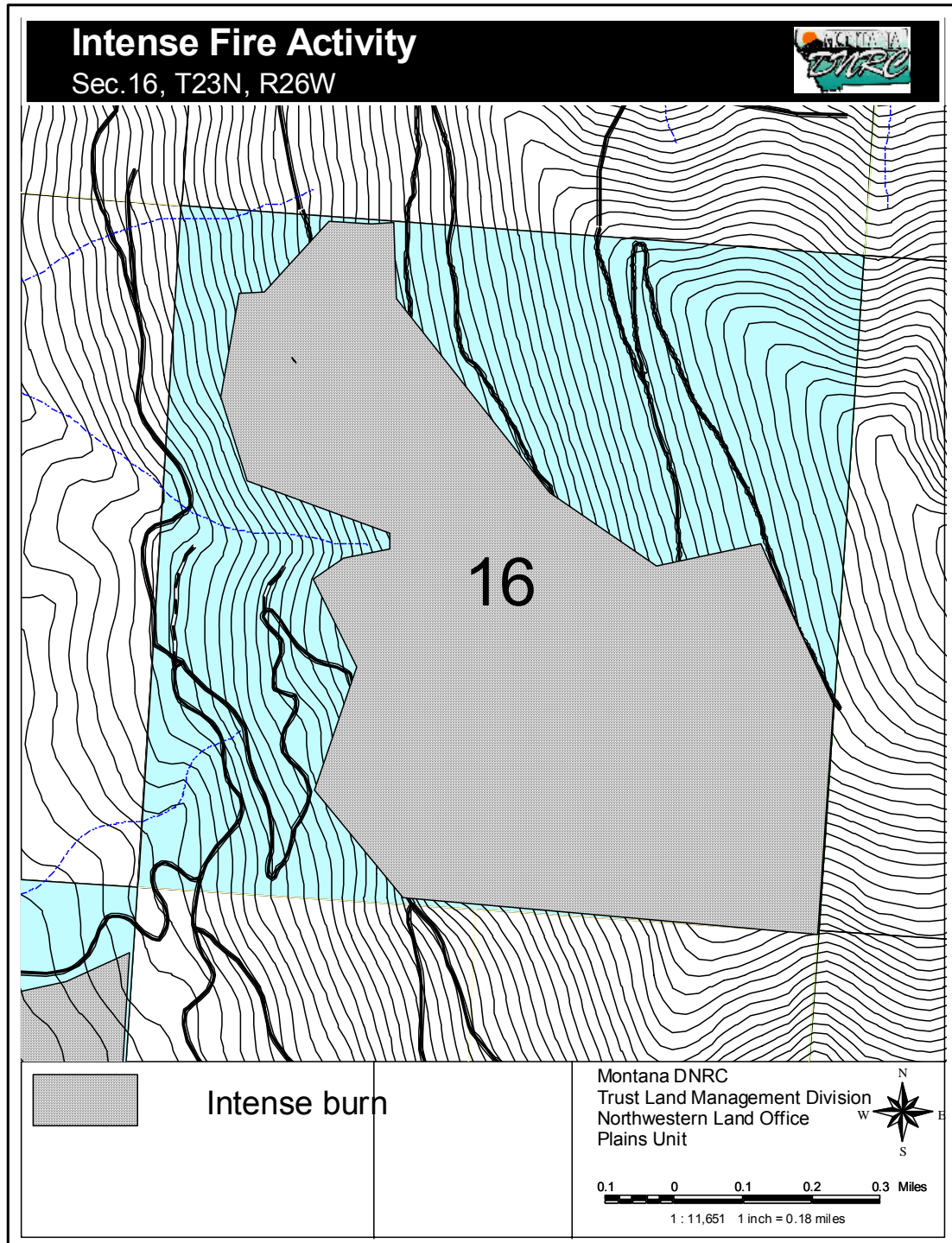
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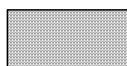
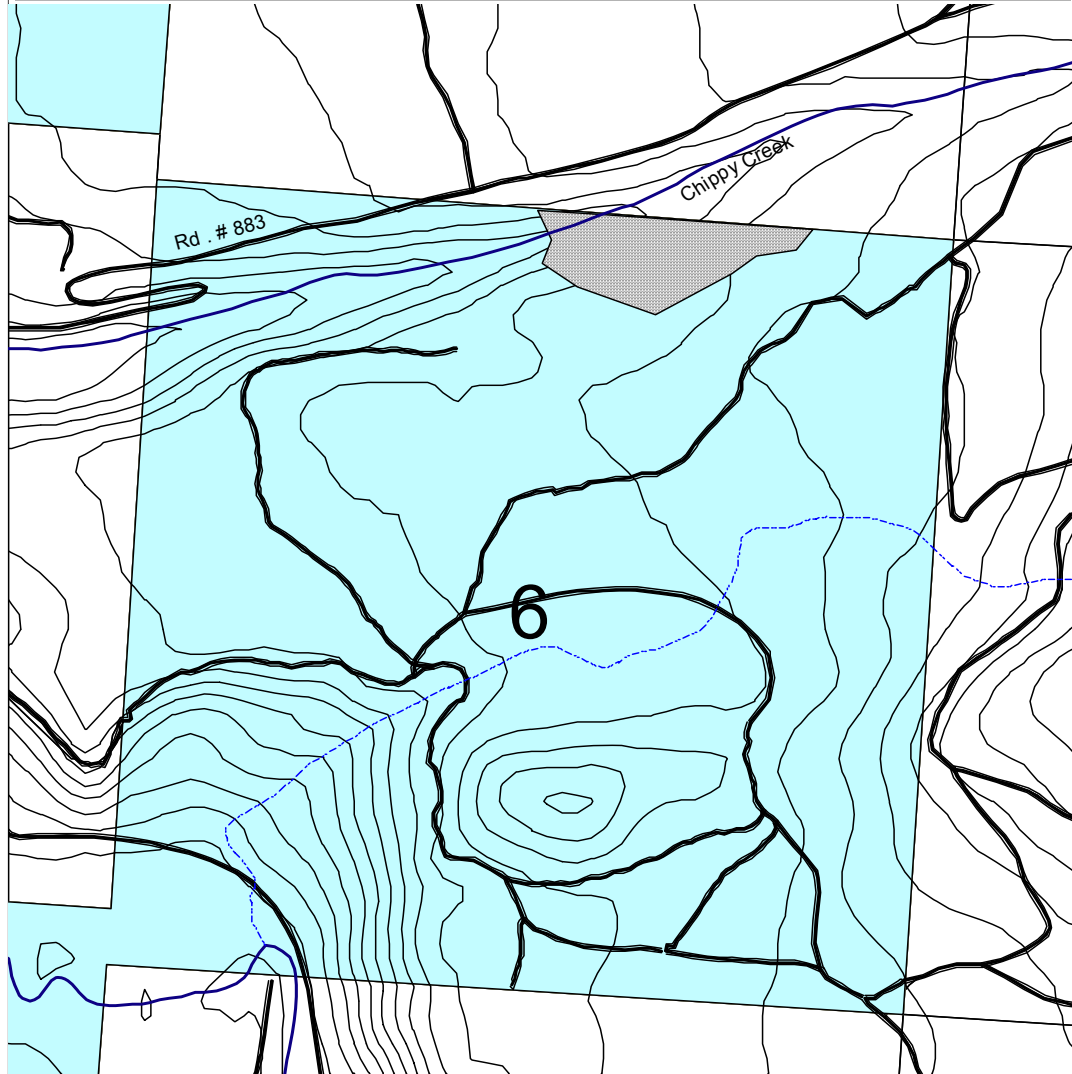
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Intense Fire Activity

Sec. 6, T23N, R26W



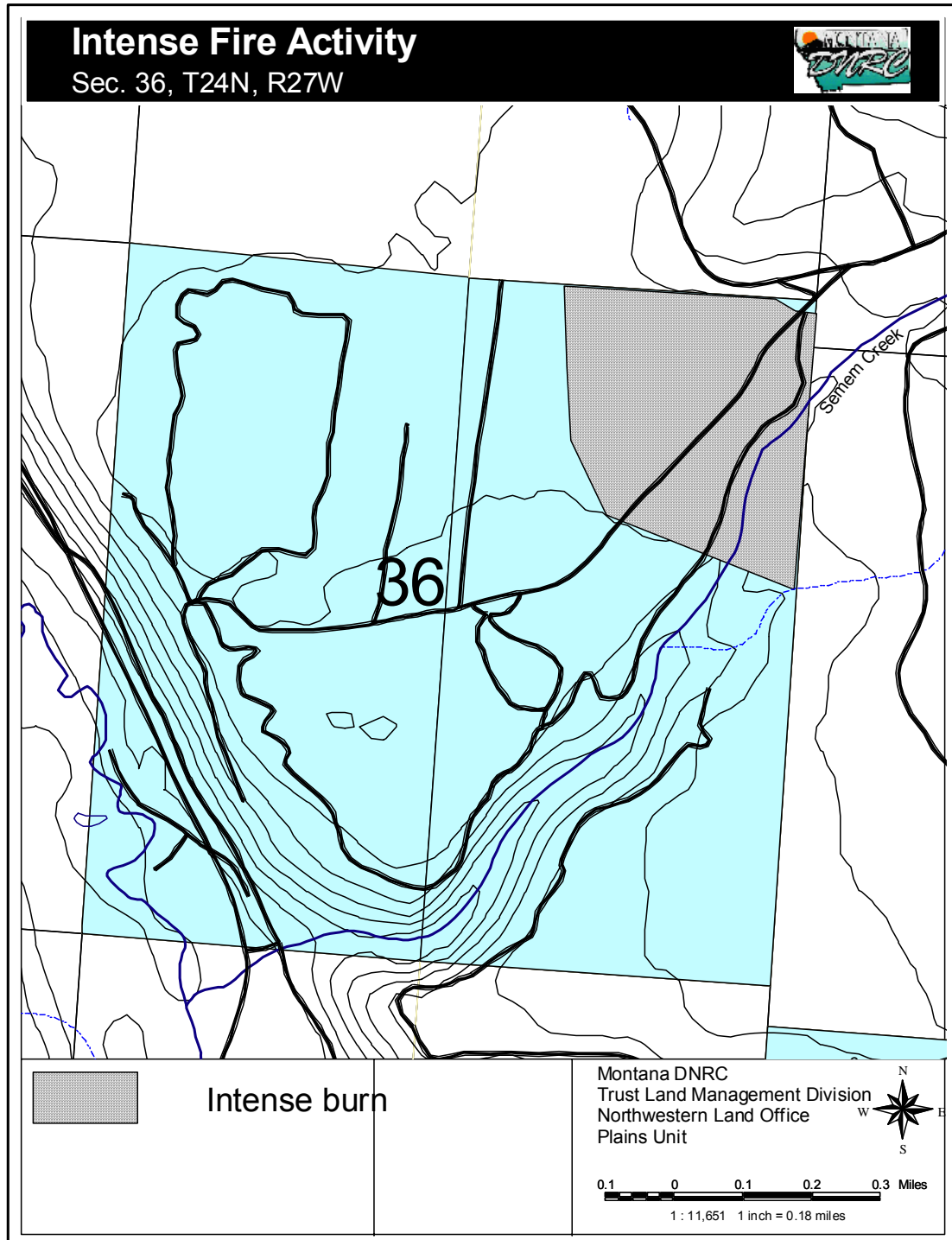
Intense burn

Montana DNRC
Trust Land Management Division
Northwestern Land Office
Plains Unit



0.1 0 0.1 0.2 0.3 Miles
1 : 11,651 1 inch = 0.18 miles

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Attachment II

Resource Analyses

	Page #
Vegetation Analysis	34
Hydrology/Fisheries Analysis	42
Soils Analysis	50
Wildlife Analysis	57
Archaeological Analysis	78

Vegetation Analysis

Introduction

This analysis is designed to disclose the existing condition of the vegetative resource and display the anticipated effects that would result from each alternative of this proposal. During the initial scoping, issues were developed internally regarding vegetative concerns. The following concerns were expressed from these comments regarding proposed timber harvesting and related activities:

- Concern for a timely salvage operation of recently burned timber.
- Concern regarding impacts to threatened or endangered animal species (TES).
- Forest Health: There are concerns that endemic populations of diseases and insects could increase in the fire perimeter and surrounding area and have the potential to reach epidemic proportions or reduce productivity.
- Concern for soil erosion with the combination of the vegetation and duff layers that are burned and the use of equipment on the soils.

Analysis Areas

The analysis area for direct and indirect effects to the state Section 16, Township 23N, Range 26W, referred to as the Cook Mountain parcel; Sections 20 and 28, Township 23N, Range 26W, referred to as the Martin Creek parcel and the Upper Sears Gulch parcel; Section 6, Township 23N, Range 26W, referred to as the Chippy Creek parcel and Section 36, Township 24N, Range 27W referred to as the Semem Creek parcel. Cumulative impacts are considered at the scale of the Plains Unit. Due to the distance between sections and changing fire intensity, each section will be analyzed separately.

Analysis Method

The Plains Unit typically prepares two to four timber sales per year. Each project is evaluated for its potential effects on lands managed by the DNRC and the surrounding landscape. Methods used in the analysis included review of stand level inventory (SLI) data, field visits, review of scientific literature, aerial photography, and consultation with other professionals.

Existing Conditions – All Sections

Past and current events have changed the forest conditions on the proposed area from what would have been present historically according to Losensky's "Historical Vegetation of Montana" (1997). The area was historically characterized by frequent, low-intensity wildfires prior to the early 1900's. Until the Chippy Creek Fire of 2007, fire has been virtually excluded from the area since the early 1900's.

Existing Conditions — Section 16, T23N, R26W

Logging activities have occurred on the proposed area since the 1940's. Section records show the Cook Mountain parcel has had two timber sales removing 1,828 mbf in 1945 and 1,000 mbf in 1997. There have been a numerous commercial Christmas tree permits, the last being issued in 1959. Four timber salvage permits totaling 86 mbf were issued between 1975 and 1983. Pre-fire Current Cover Types and Potential Vegetation Class stand maps can be seen in Attachment I, Maps and Project Plan.

The Chippy Creek Fire burned intensely through the southeast and northwest quarters of the section leaving virtually no live vegetation; mortality is high in all strata in these areas (See Attachment A "Intense Fire Activity" Maps). The fire was less intense in the northeast and the southwest quarters of the section, with evidence of individual and group torching. There are some large diameter ponderosa pine and western larch in these areas which may survive the effects of the fire. See Attachment III, Prescriptions, for more detailed descriptions of current vegetative conditions. Although many Douglas-fir have green crowns, the boles are scorched an average of 30-35 feet, killing the cambium layer and making the tree susceptible to insect infestation. Both the overstory and understory Douglas-fir in this section are heavily infested with mistletoe. There is visual evidence of logging trails, corridors and landings from past management actions on State land; however, the parcel is surrounded by private ownership that has been previously harvested, and views of past logging are common in the area. The pine beetle (*Dendroctonus ponderosae*) and Red turpentine beetle (*Dendroctonus valens*) are already active in the black, fire stressed, and dead ponderosa pine and lodgepole pine throughout the burned area.

The primary insect and disease agents in the stands are infestations of Dwarf mistletoe (*Arceuthobium douglasii* & *Arceuthobium laricis*), Fir Engraver beetle (*Scolytus ventralis*), Douglas-fir beetle (*Dendroctonus pseudotsugae*).

Noxious weeds, mainly knapweed, are present throughout the project area, mostly prevalent along open roads and within stand openings.

Existing Conditions--Section 16, T23N, R26W

Direct and Indirect Effects

No Action Alternative

Under the No Action Alternative, no timber harvest or associated activities would occur. The opportunity to contribute revenue to the School Trust Fund by salvaging recently fire killed timber would be lost. Insects and disease would likely increase due to the susceptibility of fire-stressed trees. Noxious weeds would continue to exist along the roads and move into the forested areas, as the fire has provided available seedbeds.

Action Alternative

Under the Action alternative, recently fire-killed timber would be salvage harvested from approximately 511 acres on the Cook Mountain parcel. Dominant and co-dominant ponderosa pine and disease-free western larch with good crowns and vigor that may have survived the recent fire would be left to provide a native seed source to the newly exposed seed bed. A minimum of two snags per acre 21" DBH and greater, and two

snag recruits per acre, where present (if they are not a safety hazard) would also be left. Planting needs would be assessed and tree seedlings, most likely ponderosa pine and western larch, would be planted. More detailed information for treatment by individual units can be obtained in Attachment III, "Prescriptions".

Noxious weeds may increase in canopy openings and would thus be monitored and addressed through an integrated pest management plan including chemical and biological control methods. Roads and skid trail approaches would be seeded and spot treated with chemicals following construction and project completion. Prior to entering the site, off-road logging equipment would be cleaned and inspected through the timber sale contract to avoid seed migration. Roads would be closed following the sale to avoid migration of weed seed into the area. Post-harvest, the area would be included in the Plains Unit's integrated weed management program. Biological, mechanical and chemical methods would be used to control noxious weeds.

Cumulative Effects

No Action Alternative

Under the No Action Alternative, stand structure and species composition on State land across the Plains Unit are expected to continue changing toward shade-tolerant species. The stands in this section would be dominated by an even-aged, seral species, such as lodgepole pine. According to Losensky (1997), historically in western Montana underburn fires would occur on a 50- year cycle on gentle terrain, a mixed severity fire burned on a 60-125 year cycle and a stand replacement fire, such as the Chippy Creek Fire, would occur between 150-360 years. The sequence would start with a stand replacement event followed by regrowth of a dense new stand of lodgepole pine. Fuel loading and down woody debris would be expected to increase as dead and dying trees fall. Mortality within the burned area and adjacent stands would increase from the impacts of insects and disease.

Action Alternative

Across the Plains Unit, there would be a slight change toward desired potential vegetation class. The Chippy Creek Fire has provided the scarification and open canopy to encourage western larch and ponderosa pine regeneration, however in areas of intense burning there is no seed source to reach the desired future conditions. Due to road construction, approximately 5 acres would be removed from timber production.

Existing Conditions — Section 28, T23N, R26W

Section records for the Upper Seared Gulch parcel show that 2,315 mbf of ponderosa pine and 1,430 mbf of Douglas-fir were harvested from this parcel between 1945 and 1954. A post-fire inventory supports these records. An old road system, designed for the use of short line 'Idaho jammers', is still in place. The portion of this parcel that was not 'jammer logged' was cat logged, as shown by old 'cat tracks' that are now visible after the fire.

The pre-fire condition was a two-story stand of remnant dominant ponderosa pine and Douglas-fir, along with minor amounts of western larch. The understory was comprised of Douglas-fir and ponderosa pine with minor amounts of grand fir and lodgepole pine. Past management activities may have also contributed to an overstocking of Douglas-fir.

The pine beetle (*Dendroctonus ponderosae*) and Red turpentine beetle (*Dendroctonus valens*) are already active in the black, fire-stressed and dead ponderosa pine and lodgepole pine throughout the burned area. The Douglas-fir are heavily infected with Dwarf mistletoe, *Arceuthobium douglasii* and most of the existing western larch are also infected with mistletoe, *Arceuthobium laricis*.

The recent fire has created a mosaic effect, with some areas experiencing intense, stand-replacing crown fire, and other areas that were affected by surface fire. In the intensely burned areas, mortality is high in all strata and virtually no live vegetation remains (See Attachment A "Intense Fire Activity" Maps). However, areas that saw only surface fire left patches of timber where some large-diameter ponderosa pine may survive and would provide seed for regeneration. See Attachment III, Prescriptions, for detailed descriptions of current vegetative conditions.

Direct and Indirect Effects

No Action Alternative

Under The No Action Alternative, no timber harvest or associated activities would occur. The opportunity to contribute revenue to the School Trust Fund by salvaging recently fire killed timber would be lost. Insects and disease would increase due to the susceptibility of fire-stressed trees. Noxious weeds would continue to exist along the roads and move into the forested areas as, as the fire has provided available seedbeds.

Action Alternative

Under the Action Alternative, recently fire-killed timber would be salvage harvested from approximately 260 acres on the Upper Seared Gulch parcel. Dominant and co-dominate trees with good crowns and vigor that may have survived the recent fire would be left to provide a native seed source to the newly exposed seed bed. A minimum of two snags per acre, 21" DBH & greater, and two snag recruits per acre, where present (if they are not a safety hazard) would also be left. Gated road closures would prevent the unauthorized removal of snags. More detailed information for treatment by individual units can be obtained in Attachment III, Prescriptions. Noxious weeds would be monitored and addressed through an integrated pest management plan including chemical and biological control methods.

Cumulative Effects

No Action Alternative

Under the No Action Alternative, stand structure and species composition on the parcel would be mostly an even-aged, fire dependant species, such as lodgepole pine. In areas of less intense burn an occasional western larch and ponderosa pine could regenerate if the seed source exists. Mistletoe would continue to thrive in the regenerating stands of Douglas-fir and western larch. Mortality would increase as fire-killed or stressed trees are infested with insects. Fuel loading would increase as the dying trees fall over.

Action Alternative

Across the Plains Unit, there would be a slight increase toward desired cover types, as the Chippy Creek Fire has altered the current cover type. The project area would be altered with regard to overall size class distribution and stocking levels.

Existing Conditions — Section 20, T23N, R26W

Section records for the Martin Creek parcel indicate that the section had numerous timber sales. Between 1945 and 1953, 7,576 mbf of ponderosa pine and Douglas-fir was harvested from this parcel. In 1967, 1,510 mbf and 5,746 mbf in 1972 were harvested. Another large timber sale in 1990 harvested 1,028 mbf of sawlogs. An old road system, closed with earthen barriers, is in place. The main road through the Section, Martin Creek Road # 219, was used as the fireline for the Chippy Creek Fire.

The pre-fire condition was a multi-story stand. The dominant overstory trees were ponderosa pine and Douglas-fir along with a few scattered western larch. The understory was comprised of Douglas-fir, ponderosa pine and lodgepole pine. The northeast quarter, the northeast quarter of the southeast quarter, and the northwest quarter within Section 20 burned intensely, leaving virtually no live vegetation with high levels of mortality in all strata and no significant canopy cover (See Attachment A “Intense Fire Activity” Maps). The pine beetle (*Dendroctonus ponderosae*) and Red turpentine beetle (*Dendroctonus valens*) are already active in the black, fire-stressed and dead ponderosa pine and lodgepole pine throughout the burned area. In areas that were under burned, mainly parts of the SMZ's and the northwest quarter of the northeast quarter, patches of timber were left where some large-diameter ponderosa pine and western larch may survive and provide seed for regeneration. See Attachment III, Prescriptions, for detailed descriptions of current vegetative conditions.

Direct and Indirect Effects

No Action Alternative

Under the No Action Alternative, no timber harvest or associated activities would occur. The opportunity to contribute revenue to the School Trust Fund by salvaging recently fire killed timber would be lost. Insects and disease would increase due to the susceptibility of fire-stressed trees. Noxious weeds would continue to exist along the roads and move into the forested areas as the fire has provided available seedbeds.

Action Alternative

Under the Action Alternative, recently fire-killed timber would be salvage harvested from approximately 315 acres on the Martin Creek parcel. Dominant and co-dominant trees with good crowns and vigor that may have survived the recent fire would be left to provide a native seed source to the newly exposed seed bed. A minimum of two snags per acre, 21” DBH & greater, and two snag recruits per acre, where present (if they are not a safety hazard) would also be left. Earthen barrier road closures would prevent the unauthorized removal of snags. More detailed information for treatment by individual units can be obtained in Attachment III, Prescriptions. Noxious weeds would be monitored and addressed through an integrated pest management plan including chemical and biological control methods.

Cumulative Effects

No Action Alternative

Under the No Action Alternative, stand structure and species composition on the parcel would be mostly an even-aged, fire dependant species, such as lodgepole pine. In less-intensely burned areas an occasional western larch and ponderosa pine could regenerate if the seed source exists. Mortality would increase as fire-killed or stressed trees are infested with insects. Fuel loading would increase as the dying trees fall over.

Action Alternative

Across the Plains Unit, there would be a slight increase toward desired cover types, as the Chippy Creek Fire has altered the current cover type. The project area would be altered with regard to overall size class distribution and stocking levels.

Existing Conditions — Section 36, T24N, R27W

Section records for the Semem Creek parcel indicate the section had numerous small timber sales between 1944 and 1990 totaling approximately 239 mbf. A large timber sale in 1948 harvested 6,500 mbf of sawlogs. A current timber sale in Section 36 is projected to harvest an estimated 3,200 mbf. The pre-fire condition was a multi-story stand consisting of an overstory with dominant Douglas-fir along with a scattered ponderosa pine and a few western larch, and an understory comprised of Douglas-fir, ponderosa pine, lodgepole pine and grand fir. The Douglas-fir in the Semem Creek SMZ was heavily infested with mistletoe.

A portion of the northeast quarter of the section was burned before the fire crossed into abutting Plum Creek land. The fire burned across the flat and through the Semem Creek SMZ and continued east. Fire intensity was extreme, leaving virtually no live vegetation and high levels of mortality in all strata and no significant canopy cover (See Attachment A “Intense Fire Activity” Maps). The pine beetle (*Dendroctonus ponderosae*) and Red turpentine beetle (*Dendroctonus valens*) are already active in the black, fire-stressed and dead ponderosa pine and lodgepole pine throughout the burned area. See Attachment III, Prescriptions, for detailed descriptions of current vegetative conditions.

Direct and Indirect Effects

No Action Alternative

Under the No Action Alternative, no timber harvest or associated activities would occur. The opportunity to contribute revenue to the School Trust Fund by salvaging recently fire killed timber would be lost. Insects and disease would increase due to the susceptibility of fire-stressed trees. Noxious weeds would continue to exist along the roads and move into the forested areas as the fire has provided available seedbeds.

Action Alternative

Under the Action Alternative, recently fire-killed timber would be salvage harvested from approximately 20 acres on the Semem Creek parcel. Dominant and co-dominant trees with good crowns and vigor that may have survived the recent fire would be left to provide a native seed source to the newly exposed seed bed. A minimum of two snags per acre, 21” DBH & greater, and two snag recruits per acre, where present (if they are not a safety hazard) would also be left. More detailed information for treatment by individual units can be obtained in Attachment III, Prescriptions. Noxious weeds would

be monitored and addressed through an integrated pest management plan including chemical and biological control methods.

Cumulative Effects

No Action Alternative

Under the No Action Alternative, stand structure and species composition on the parcel would be mostly an even-aged, fire dependant species, such as lodgepole pine. In less-intensely burned areas an occasional western larch and ponderosa pine could regenerate if the seed source exists. Mortality would increase as fire killed or stressed trees are infested with insects. Fuel loading would increase as the dying trees fall over.

Action Alternative

Across the Plains Unit, there would be a slight increase toward desired cover types, as the Chippy Creek Fire has altered the current cover type. The project area would be altered with regard to overall size class distribution and stocking levels.

Existing Conditions — Section 6, T23N, R26W

Section records for the Chippy Creek parcel indicate that the section had numerous timber sales between 1944 and 1990. The latest large timber sale in 1990 harvested 1,000 mbf of sawlogs. The pre-fire condition was a multi-story stand consisting of an overstory with dominant ponderosa pine and Douglas-fir along with a few scattered western larch, and an understory comprised of Douglas-fir, ponderosa pine and lodgepole pine. The Douglas-fir in the Chippy Creek SMZ was heavily infested with mistletoe.

A small portion of the section was burned along the north section line abutting Plum Creek land. The fire burned through the Chippy Creek SMZ and continued east along the section boundary. Fire intensity was extreme, leaving virtually no live vegetation and high levels of mortality in all strata and no significant canopy cover (See Attachment A "Intense Fire Activity" Maps). The pine beetle (*Dendroctonus ponderosae*) and Red turpentine beetle (*Dendroctonus valens*) are already active in the black, fire-stressed and dead ponderosa pine and lodgepole pine throughout the burned area. Areas that were under burned, mainly a small part of the northeast quarter, left patches of timber where some large-diameter ponderosa pine and western larch may survive and provide seed for regeneration. See Attachment III, Prescriptions, for detailed descriptions of current vegetative conditions.

Section 6, T23N, R26W

Direct and Indirect Effects

No Action Alternative

Under the No Action Alternative, no timber harvest or associated activities would occur. The opportunity to contribute revenue to the School Trust Fund by salvaging recently fire-killed timber would be lost. Insects and disease would increase due to the susceptibility of fire-stressed trees. Noxious weeds would continue to exist along the roads and move into the forested areas as the fire has provided available seedbeds.

Action Alternative

Under the Action Alternative, recently fire-killed timber would be salvage harvested from approximately 30 acres on the Chippy Creek parcel. Dominant and co-dominant trees

with good crowns and vigor that may have survived the recent fire would be left to provide a native seed source to the newly exposed seed bed. A minimum of two snags per acre, 21" DBH & greater, and two snag recruits per acre, where present (if they are not a safety hazard) would also be left. More detailed information for treatment by individual units can be obtained in Attachment III, Prescriptions. Noxious weeds would be monitored and addressed through an integrated pest management plan including chemical and biological control methods.

Cumulative Effects

No Action Alternative

Under the No Action Alternative, stand structure and species composition on the parcel would be mostly an even-aged, fire dependant species, such as lodgepole pine. In less-intensely burned areas an occasional western larch and ponderosa pine could regenerate if the seed source exists. Mortality would increase as fire-killed or stressed trees are infested with insects. Fuel loading would increase as the dying trees fall over.

Action Alternative

Across the Plains Unit, there would be a slight increase toward desired cover types, as the Chippy Creek Fire has altered the current cover type. The project area would be altered with regard to overall size class distribution and stocking levels.

HYDROLOGY and FISHERIES ANALYSIS

Introduction

This analysis is designed to disclose the existing condition of the hydrologic resources and display the anticipated effects that may result from each alternative of this proposal. During the initial scoping, no issues were identified by the public regarding water quality or quantity or fisheries resources. The following issue statements were expressed from internal comments regarding the effects of proposed timber harvesting:

- Timber harvesting and road construction activities may increase sediment delivery into streams and affect water quality.
- Actions related to the proposed timber sale may adversely affect stream temperatures, stream shading, stream sediments and recruitable large woody debris in Semem Creek, Chippy Creek, Marten Creek, Little Rock Creek, Sears Gulch and Thompson River.

These issues can best be evaluated by analyzing the anticipated effects of harvest prescriptions and sediment delivery on the water quality of streams in the project area.

The Environmental Effects sections disclose the anticipated indirect, direct and cumulative effects to water resources within the analysis area from the proposed actions. Past, current, and future planned activities on all ownerships within each analysis area have been taken into account for the cumulative effects analysis.

The primary concerns relating to aquatic resources within the analysis area are potential impacts to water quality from sources outside the channel as well as inside the channel. In order to address these issues the following parameters are analyzed by alternative:

- Miles of new road construction and road improvements
- Potential for sediment delivery to streams
- Level of harvest regarding removal of shade and recruitable woody debris near fish-bearing streams

Analysis Method

Sediment Delivery

The methods applied to the project area to evaluate potential direct, indirect and cumulative effects include a field review to look at potential sediment sources from haul routes. Roads were evaluated to determine existing sources of introduced sediment. In addition, soil types in the project area were reviewed to identify areas prone to sediment delivery.

Fisheries Habitat Parameters

Expected effects to fisheries habitat will be addressed qualitatively using the current condition as a baseline disclosing the expected changes due to the alternatives proposed. The analysis method for woody debris recruitment will evaluate the potential reduction in available woody debris and shading due to timber harvest activities.

Analysis Area

Sediment Delivery

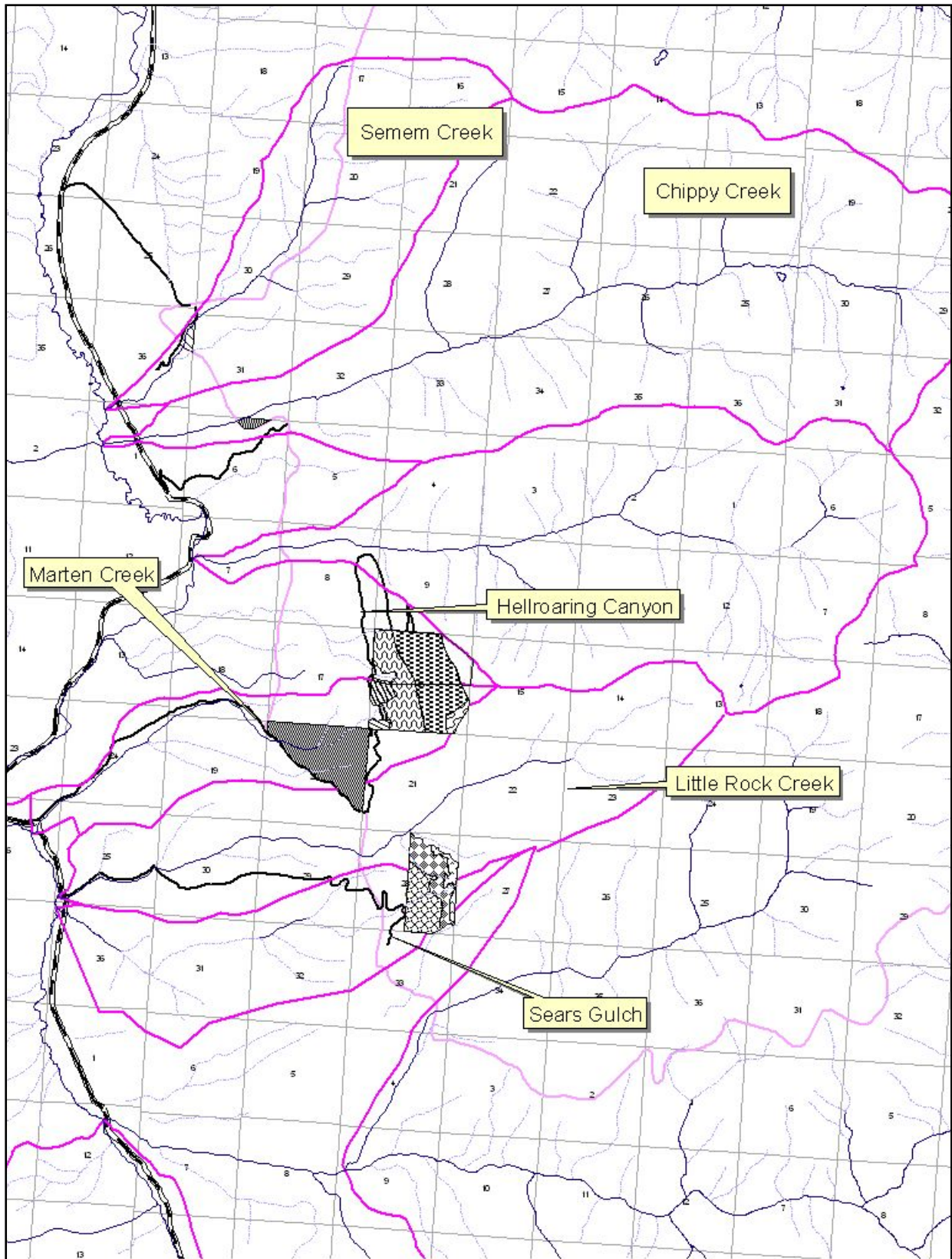
The analysis area for sediment delivery is limited to the harvest units and roads used for hauling. This includes in-channel and upland sources of sediment that could result from this project. In-channel areas include stream channels adjacent to- and downstream of harvest areas. Upland sources include harvest units and roads that may contribute sediment delivery as a result of this project.

Fisheries Habitat Parameters

The analysis area for fisheries habitat parameters is the harvest units on DNRC managed land immediately adjacent to fish-bearing streams. This includes all harvest units in the Semem Creek and Chippy Creek parcels (Sec 36, T24N, R27W and Sec 6, T23N, R26W). Because field review

verified that no fish-bearing streams are present in the remaining parcels this parameter will not address Marten Creek, Little Rock Creek, Sears Gulch or the Thompson River.

Figure H1: Project Watersheds



Water Uses and Regulatory Framework

Water Quality Standards

This portion of the Clark Fork River basin, including the Thompson River and its tributaries is classified as B-1 by the State of Montana Department of Environmental Quality (DEQ), as stated in the Administrative Rules of Montana (ARM 17.30.607). The water quality standards for protecting beneficial uses in B-1 classified watersheds are located in ARM 17.30.623. Water in B-1 classified waterways is suitable for drinking, culinary and food processing purposes after conventional treatment, bathing, swimming and recreation, growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers, and agricultural and industrial water supply. State water quality regulations prohibit any increase in sediment above naturally occurring concentration in water classified B-1. Naturally occurring means condition or materials present from runoff or percolation over which man has no control or from developed land where all reasonable land, soil and water conservation practices have been applied. Reasonable land, soil and water conservation practices include methods, measures or practices that protect present and reasonably anticipated beneficial uses. The State of Montana has adopted Best Management Practices (BMPs) through its non-point source management plan as the principle means of meeting the Water Quality Standards.

Water Quality Limited Waterbodies

None of the tributaries to the Thompson River or Little Thompson River associated with this salvage are listed as a water quality limited water body in the 2006 303(d) list; however the Little Thompson River is listed for not fully supporting aquatic life and cold water fisheries. The 303(d) list is compiled by the Montana Department of Environmental Quality as required by Section 303(d) of the Federal Clean Water Act and the Environmental Protection Agency Water Quality Planning and Management Regulations (40 CFR, Part 130). Under these laws, DEQ is required to identify water bodies that do not fully meet water quality standards, or where beneficial uses are threatened or impaired.

Streamside Management Zone Law (SMZ)

All rules and regulations pertaining to the Streamside Management Zone (SMZ) Law will be followed. An SMZ width of 100 feet is required on Class I and II streams when the slope is greater than 35%. An SMZ width of 50 feet is required when the slope is less than 35%.

State Forest Land Management Rules

All applicable rules and regulations regarding watershed and fisheries management will be followed. This includes but is not limited to water quality (ARM 36.11.422), cumulative effects (36.11.423) Riparian Management Zones (ARM 36.11.425) and Fisheries (ARM 36.11.427).

As part of ARM 36.11.427(3)(a)(i) and (iv) and ARM 36.11.436, DNRC is committed to designing forest management activities to protect and maintain westslope cutthroat trout and all other sensitive fish and aquatic species. DNRC is a signatory to the 2007 (interagency) Memorandum of Understanding and Conservation Agreement for Westslope Cutthroat Trout.

Water Rights and Beneficial Users

Water rights for surface water exist downstream of the project area on the Semem Creek, Chippy Creek, Marten Creek, Thompson River and for domestic use, stock watering, industrial use, irrigation, lawn and garden and fire protection.

EXISTING CONDITION

Sediment Delivery and Fish Habitat Parameters

Semem Creek is a quite stable Rosgen B4, Class I stream in an approximate 3855 acre watershed. Ownership within the watershed can be found on Table HT-1. The stream flows east-to-west into the Thompson River. Average precipitation is about 30 inches per year, mostly in the form of snow. Stability is considered 'good' because very few raw banks were identified and no indications of mass substrate movements were noted. For more information regarding channel stability, refer to the project file. According to the Montana Fisheries Information System (MFISH),

eastern brook trout, rainbow trout and westslope cutthroat trout inhabit the stream. While the eastern brook trout and westslope cutthroat trout are considered rare, rainbow trout are common year-round residents.

As part of the Big Prairie Timber Sale (DNRC, 2004), much of the DNRC managed lands in the watershed were harvested or were in the process of being harvested, however no timber removal was planned within 150 feet or more of the stream. Therefore, the riparian area was intact prior to the Chippy Creek Fire with adequate amounts of recruitable large woody debris and riparian vegetation providing shade. The Chippy Creek fire burned approximately 69% of the watershed during August of 2007 including about 16 acres of previously unharvested area near the stream. On the DNRC managed lands, most vegetation was killed during the fire.

During field reconnaissance, no sediment delivery to Semem Creek was identified from roads or upland sources however the loss of vegetation during the fire has left these slopes in a condition of increased erosion potential. The steep terrace slopes near the stream channel have a high delivery potential due to their slopes and proximity to the stream.

Chippy Creek is a marginally stable Rosgen B4, Class I stream in an approximate 11860 acre watershed. The stream flows east-to-west into the Thompson River. Average precipitation is about 30 inches per year, mostly in the form of snow. Stability is considered marginal in this watershed because of chaotic channel migration after the 1997 high runoff. Field review as part of the Cook/Bear Timber Sale analysis indicated that the migration and partial washout of the county road was due to a failed debris jam and/or rain-on-snow event. According to the Montana Fisheries Information System (MFISH), eastern brook trout, rainbow trout and westslope cutthroat trout inhabit the stream. Eastern brook trout are considered abundant, rainbow trout are common year-round residents and westslope cutthroat trout are considered rare in this stream.

As part of the Cook/Bear Timber Sale (DNRC, 1997), a portion of the DNRC managed lands in the Chippy Creek watershed were harvested using ground based equipment, however, much like the Semem Creek watershed, no harvest was planned or conducted near the stream. Therefore, the riparian area was intact with adequate vegetation for shading and recruitable large woody debris prior to the Chippy Creek Fire. The Chippy Creek Fire burned approximately 97% of this watershed including about 15 acres of DNRC managed land.

During field reconnaissance, no sediment delivery to Chippy Creek was identified from roads or upland sources however the loss of vegetation during the fire has left these uplands in a condition of increased erosion potential. The steep terrace slopes near the stream channel have a high delivery potential due to their slopes and proximity to the stream. This condition is especially true in the post-fire environment due to the lack of vegetative cover.

Marten Creek is a relatively stable Class I stream in an approximately 2360 acre watershed. Ownership within the watershed can be found on Table HT-1. This stream flows east-to-west into the Little Thompson River. Average precipitation is about 30 inches per year, mostly in the form of snow. This stream is considered as relatively stable because of the gentle gradient and angular substrate. Three separate tributaries to Marten Creek are located with the Marten Creek parcel (Sec 20, T23N, R26W) although none of the tributaries were identified during field review as a perennial stream providing fish habitat. One of the tributaries is considered a Class III stream because it is discontinuous and flows less than six months of the year; two of the tributaries are considered as Class I segments because they contribute to downstream waterbodies and indicate flow greater than 6 months of the year, although the rate of flow is very low. Past analysis by DNRC Hydrologist indicate that "Peak flows are only slightly above average flow and late summer flows are nearly bankfull." (Frank, 1990) This suggests that these headwater tributaries are spring fed with very little fluctuation during spring runoff. Field review during September 2007 identified several upwellings in the channel that were wet. The Chippy Creek Fire burned approximately 42% of this watershed including about 582 acres of DNRC managed land (290 acres in Sec 20 T23N, R26W and 292 acres in Sec 16 T23N, R26W).

During field reconnaissance, one 24" culvert on the Class III tributary was identified as needing an upgrade to limit the potential for sediment delivery. A second tributary may be undersized for upcoming spring runoff and has been recommended for upsizing. As part of the reconnaissance, two dilapidated log culverts were identified in the Class III tributary that should be removed or replaced to minimize sediment delivery into the stream.

Little Rock Creek is a Class I stream in an approximately 4691 acre watershed. Ownership within the watershed can be found on Table HT-1. This stream flows east-to-west into the Little Thompson River. Average precipitation is about 30 inches per year, mostly in the form of snow. Although the United State Geological Service (USGS) topographical map identifies two tributaries to Little Rock Creek in Sec 28, T23N, R26W, field review confirmed that neither location has a stream channel. While DNRC manages no burned lands near the stream, approximately 62% of the watershed was impacted by the Chippy Creek Fire, including 166 acres of state land.

During field reconnaissance, no sediment delivery to Little Rock Creek was identified from upland sources on state managed lands or the proposed haul route.

Sears Gulch is a class I stream in an approximate 2516 acre watershed. Ownership within the watershed can be found on Table HT-1. This stream flows east-to-west into the Little Thompson River. Average precipitation is about 30 inches per year, mostly in the form of snow. Although the USGS topographical maps shows this stream originating on DNRC managed land in Sec 28, T23N, R26W, field review confirmed that no stream channel exists on DNRC managed land.

During field reconnaissance, no sediment delivery to Sears Gulch was identified from upland sources on state managed lands or the proposed haul route.

Hellroaring Canyon contains several intermittent channels in an approximate 2115 acre watershed that contributes flow to the Thompson River. Approximately 305 acres of DNRC managed land in this watershed was burned in the Chippy Creek Fire. Although the USGS topographical maps show streams originating on DNRC managed land in Sec 16, T23N, R26W, field review confirmed that no stream channels exist on DNRC managed land.

During field reconnaissance, no sediment delivery to Hellroaring Canyon was identified from upland sources on state managed lands or the proposed haul route.

Table HT-1: Land Ownership and Fire Impacts on Cook Mtn Salvage Watersheds

Watershed Name	Watershed Acres	Ownership				Acres Burned	% Burned
		PCTC	State (DNRC)	USFS	Other		
Semem Cr	3854	3251	198	405	0	2658	69%
Chippy Cr	11858	2238	164	9456	0	11530	97%
Marten Cr	2360	1060	1164	21	115	990	42%
Sears Gulch	2516	1271	1185	60	0	418	17%
Little Rock	4691	1772	756	2163	0	2954	62%

ENVIRONMENTAL EFFECTS

Description of Alternatives

No Action Alternative

No timber harvest or associated activities would occur under this alternative.

Action Alternative

Eleven units totaling approximately 1120 acres would be harvested under the Action Alternative. Approximately 556 acres would be harvested using conventional ground-based equipment while the remaining 564 acres would be treated using cable methods. In addition, approximately 2.75 miles of new road would be constructed, 2.3 miles of road would be reconstructed and approximately 24 miles of road would be maintained or have minor drainage improvements installed as necessary to meet BMPs. Included in this would be the removal of two dilapidated log crossing structures, and the installation of a two culverts. Harvest may be completed under summer or winter conditions

Direct and Indirect Effects

Sediment Delivery

No Action Alternative

Under this alternative, no timber harvest or related activities would occur. The potential sediment sources on Marten Creek would remain with continued risk of sediment delivery. Sediment delivery in heavily burned watersheds may increase during snowmelt or rainfall events until a vegetative cover and filter reestablishes. Debris jams may increase as higher quantities of woody debris may be incorporated into streams. Debris jams may result in additional naturally-occurring sediment delivery as channels migrate and adjust to the post-fire conditions.

High erosion risk areas adjacent to Semen Creek and Chippy Creek would have a low risk of sediment delivery when the stream is away from the toe of the slope and a moderate risk of sediment delivery when the stream is located at the toe of the slope. This is a function of gravity and location; the loose soils will move downslope; if streams are located at the toe of the slope, then delivery would be more likely.

Because substantial portions of these watersheds were burned, increased potential for channel scour may occur in streams and ephemeral draws in response to elevated spring flows. This effect could range from minor scour that erodes short segments of draws to heavy scouring and gullying from rapid snowmelt or rain-on-snow events.

Action Alternative

Sediment delivery in heavily burned watersheds may increase during snowmelt or rainfall events until a vegetative filter reestablishes. Debris jams may increase as higher quantities of woody debris may be incorporated into streams. Debris jams may result in additional naturally-occurring sediment delivery as channels migrate and adjust to the post-fire conditions. Because substantial portions of these watersheds were burned, increased potential for channel scour may occur in streams and ephemeral draws in response to elevated spring flows. This effect could range from minor scour that erodes short segments of draws to heavy scouring and gullying from rapid snowmelt or rain-on-snow events

Because harvest units located in section 16 and 28 of T23N, R26W are not located near streams channels. A very low potential for sediment delivery would result from implementing this alternative in these sections.

The Marten Creek parcel (sec 20, T23N, R26W) has two Class I and one Class III tributaries in the parcel. While all laws pertaining to the SMZ law would be followed, no additional buffer on these streams is required by ARM 36.11.425. Therefore harvesting within the SMZ would occur. Due to the gentle terrain in this section, a low risk of sediment delivery into these streams would result from the implementation of this alternative.

The Semem Creek parcel would have RMZ implemented according to 36.11.425 due to high erosion risk soils and the fish-bearing status of Semem Creek. Because slopes are greater than 50% but flatten out to 0% in this area, ARM 36.11.425(2)(d) would be followed. Harvesting would be limited to areas greater than 66 feet from the stream channel and would require full-suspension skyline yarding. Because full suspension cable yarding would be employed, the risk of sediment delivery into the stream would likely be low.

The Chippy Creek parcel would have RMZ implemented according to 36.11.425 due to high erosion risk soils and the fish-bearing status of Semem Creek. Because slopes are greater than 50% but flatten out to 0% in this area, ARM 36.11.425(2) (d) would be followed and the RMZ width would be approximately 175 feet. Harvesting would be limited to areas greater than 66 feet from the toe of the slope in this area. Yarding would be conducted with a cable system that would lift the leading edge of the log. Due to the steep terrain adjacent to the stream, the risk of sediment delivery into the stream would likely be moderate in areas where the stream is located at the toe of the slope and low in areas where the stream is away from the toe of the slope.

Removing the dilapidated log crossings on Marten Creek and installing two culverts would result in moderate potential for short-term sediment delivery, however this potential would be reduced with mitigation such as sediment fence and slash filter windrows. Both stream crossings would require a Stream Protection Act permit (124 Permit) from Montana Fish, Wildlife and Parks and possibly a Short-term Water Quality Standard Exemption for turbidity from the Department of Environmental Quality (318 authorization).

The proposed road construction does not include new stream crossings. All construction would occur well away from streams on soils that are well drained, although droughty (Collins, 1985). Because revegetation may be difficult on the road fill, erosion may occur, but due to the distance from streams, sediment delivery and subsequent water quality impacts are not likely to occur.

Because DNRC would incorporate BMPs into the project design as required by ARM 36.11.422 (2), and all laws pertaining to SMZs would be followed, sediment delivery due timber harvest would have a low to moderate risk of entering streams in the project area. The risk of long-term adverse direct or indirect effects to water quality or beneficial uses would be low.

Fish Habitat Parameters

No Action Alternative

Under the No Action alternative, no reduction in recruitable woody debris or shade-providing vegetation would occur. Stream temperatures would be expected to increase due to the loss of shading throughout the entire watershed. Recruitable woody debris would not be diminished; however large amounts of trees may be incorporated into the stream in a short period of time.

Action Alternative

Under the Action Alternative, harvesting would occur within the SMZ of two fish-bearing streams: Semem Creek and Chippy Creek. No harvesting would occur within 66 feet of Semem Creek, or within 66 feet of the toe of the terrace slope adjacent to Chippy Creek. By maintaining these areas, ARM 36.11.427 would likely be met since the majority (at least 75 percent according to field measurements) of recruitable woody debris and shade-providing vegetation would be retained. Stream temperatures would also be expected to increase due to the loss of shading throughout the entire watershed due to wildfires.

Cumulative Watershed Effects

Sediment Delivery and Fish Habitat Parameters

No Action Alternative

Under the no action alternative the potential for sediment contribution from the crossings in Marten Creek would still exist. Sediment generated as a result of the Chippy Creek fire and subsequent reduction in vegetative cover and buffers would increase until vegetation reestablishes. Sediment delivery in heavily burned watersheds may increase during snowmelt or

rainfall events until a vegetative cover and filter reestablishes. Debris jams may increase as large quantities of woody debris may be incorporated into streams. Debris jams may result in additional naturally-occurring sediment delivery as channels migrate and adjust to the post-fire conditions. Fish habitat parameters such as woody debris recruitment, stream shading and stream temperature would adjust to natural climatic events.

Action Alternative

Beyond the cumulative effects expected under the No Action Alternative, this Alternative would result in reduced potential for sediment delivery into Marten Creek at the log culvert removal sites. Sediment delivery in heavily burned watersheds may increase during snowmelt or rainfall events until a vegetative filter reestablishes. Debris jams may increase as large quantities of woody debris may be incorporated into streams. Debris jams may result in additional naturally-occurring sediment delivery as channels migrate and adjust to the post-fire conditions.

Mitigation and buffers along fish bearing streams would be expected to provide adequate woody debris and shading to the stream, although slightly lower than the existing condition due to proposed harvest. Stream temperatures are not expected to increase measurably beyond those described under the No-Action Alternative. Because of the BMP implementation, project design and buffered stream corridor, the risk of additional cumulative effects due to the implementation of the Action Alternative would be expected to be low.

REFERENCES

Collins, Jeff and Ottersberg, R. 1985. Plains Unit Soil Survey. Montana Department of State Lands. Missoula, MT.

DNRC, 2004. DNRC Compiled Soils Monitoring Report on Timber Harvest Projects. Missoula, MT

Rosgen, D. L. 1996. Applied River Morphology. Wildland Hydrology, Pagosa Springs, CO

Butts, Todd, 2000. Watershed Inventory Report of the Lower Thompson Project Area. Contract #005280CSW. Contracted by DNRC, Missoula, MT.

Butts, Todd, 2000. Watershed Inventory Report of the Upper Thompson Project Area. Contract #005280CSW. Contracted by DNRC, Missoula, MT.

DNRC, 1997. Cook/Bear Timber Environmental Analysis. Plains Unit. Plains, MT

Frank, Gary, 1990. Watershed report for Marten Creek Timber Sale. Plains Unit. Plains, MT.

SOILS ANALYSIS

Introduction

This analysis is designed to disclose the existing condition of the soil resources and display the anticipated effects to soils resources that may result from each alternative of this proposal. During the initial scoping, no issues were identified by the public regarding soil impacts. The following issue statement was expressed from internal discussions regarding the potential effects of the proposed timber harvesting:

- Timber harvest activities may result in reduced soil productivity and increased erosion due to compaction and displacement, depending on area and degree of harvest effects.

Analysis Area

The analysis area for soil impacts will be the harvest units. This analysis area will adequately allow for disclosure of existing conditions, direct, indirect and cumulative impacts. The analysis area is not the entire ownership parcel unless activities are proposed on the entire parcel.

Analysis Methods

Methods for disclosing impacts include using general soil descriptions and the management implications of each landtype. In addition, a general description of the past impacts—including the Chippy Creek Fire—will assist in locating areas sensitive to impacts from erosion, compaction and displacement. Finally, this analysis will qualitatively assess the risk of negative effects to soils from erosion, compaction and displacement from each alternative using insight from previously collected soils monitoring data from over 70 post harvest monitoring projects.

While the anticipated impacts from each alternative will disclose the direct/indirect effects, the cumulative impacts will be the result of previous and proposed activities.

EXISTING CONDITIONS

General Conditions

The Plains Unit Soil Survey combines landform and soil quality information with habitat types to inventory and map soils in the project area. Soil quality is considered mainly in relation to timber management which includes road construction and a general estimation of soil productivity as two interpretations (Collins, 1985). Several landtypes were identified in the project area. Table ST-1 provides a brief description of the landtypes within the project area while Figures SF-1 thru SF-5 provides a visual depiction of the landtype locations.

Table ST-1: Project Area Landtype Descriptions

Soil Description			Management Implications (erosion hazard)	
Landtype	Name	Soil & Vegetation Descriptions	Erosion Potential	Comments
10U-D	Alluvial Lands 0-10% slopes	Well-drained soils comprised of coarse gravelly sandy and cobbly loams. Some localized wet habitats may occur in swales. Fluctuating water table can lead to occasional flooding during snowmelt.	Bare soils have a moderate erosion potential. Sediment delivery potential is moderate except on steeper banks near streams.	No timber harvest proposed on this landtype.
10-R	Alluvial Lands 0-10% slopes	Alluvial washed gravels and cobbles underlying somewhat poorly drained soils with a seasonal high water table.	Potential for flooding, erosion and sediment delivery are high near streams.	SMZ guidelines and restrictions reduce potential for erosion and delivery due to limited mechanical activities on this map unit.
13J	Deep alluvial deposits on terraces and gentle slopes above streams. 0-10% slopes	Soils are excessively well-drained and generally 8-12 inches deep. Subsoils are 20-25 inches thick and consist of very gravelly loam.	Soil erosion hazard is low to moderate. Sediment delivery efficiency is low except near streams where erodibility is greater. Runoff is slow; water erosion is low due to rapid permeability.	Timber productivity is low to moderate due to the low water holding capacity of surface soils.

15J-7/8C	Mountain sideslopes and alluvial fans above stream terraces. 0-20% slopes	Soils are deep and moderately well-drained. Shallow volcanic ash may be present on northerly aspects and in swales. Vegetation is generally Douglas fir with some grand fir on low energy slopes.	Soil erosion hazard is moderate. Native material roads can rut if wet. Improved drainage will provide a longer season of use.	Timber production is low to moderate. Well suited to tractor operations. Regeneration may be hampered by frost and plant competition.
15U-7/8 BCD	Co-Alluvial Footslopes 20-40% slopes	Soils are deep (15-20 inches) and well-drained. Subsurface soils are gravelly to very gravelly, cobbly loams. Vegetation is generally Douglas-fir with grand fir inclusions associated with swales.	Soil erosion and sediment delivery efficiency is moderate. Erosion on roads and trails can be controlled with standard drainage.	Timber productivity potential is moderate. Well suited for tractor operations. Due to high amount of stone and boulders, roads are generally rough.
30U-8/9 BCD	Mountain Sideslopes 20-40% slopes	Soils are deep and well drained. Consists of residual rock mixed with gravels and cobbles. Major habitat type is Douglas fir on south slopes and grand fir on north slopes and moist swales.	Soil erosion and sediment delivery efficiency is moderate. Erosion on roads and trails can be controlled with standard drainage.	Timber productivity potential is moderate to high. Season of use is typically long. Droughty soils may be difficult to revegetate on cut- and fillslopes.
32U-C	Frost churned ridgetops. 20-40% slopes	Soils are moderately deep and well-drained with a volcanic ash influence. Major habitat types consist of grand fir or subalpine fir, with a beargrass understory.	Soil erosion hazard is low. Delivery efficiency is low due to the distance from streams.	Timber production is moderate. Climate (temperature) is the primary limiting factor for tree growth. Plant competition is a concern for regeneration.
60	Fluvial Breaklands 60% slopes	Soils are excessively well drained, loamy skeletal textured and shallow to moderately deep (5-10 inches). Vegetation is generally Ponderosa pine, Douglas-fir and grasslands.	Angular rock content in soils contributes to a low to moderate erosion hazard on roads. Sediment delivery efficiency is high due to the steep terrain.	Potential for sediment delivery is high and will require management considerations such as cable logging and special road construction methods.

The Plains Unit is dominated by partially metamorphic, sedimentary rocks from the 600-million year old Belt Supergroup. The project area is within the Wallace Formation that encompasses the foothills and lower mountain slopes from Plains to the Thompson Lakes. Rocks in this formation are generally comprised of argillites, quartzites and siltites. Overlying these sediments is a layer of loess influenced volcanic ash deposited from Mount Mazama approximately 6700 years ago.

Figure SF-1: Semem Creek Soils

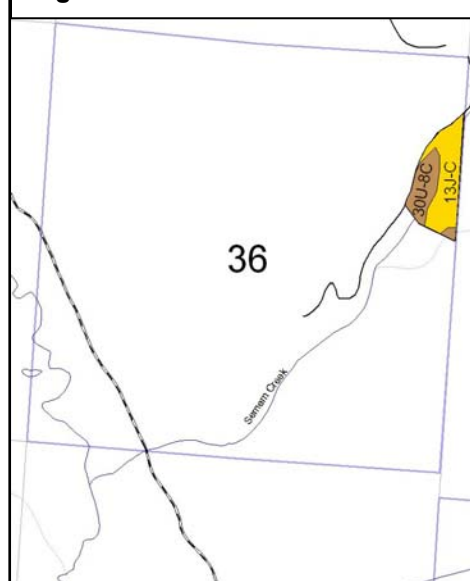
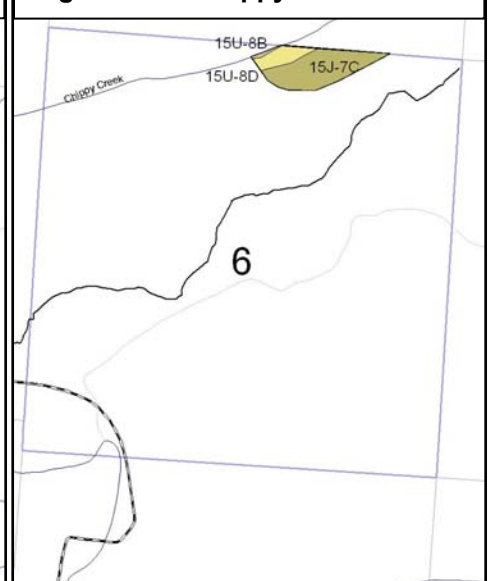


Figure SF-2: Chippy Creek Soils



Fire Impacts

During August 2007, all of the parcels proposed for salvage were burned in the Chippy Creek Fire. In general, most areas burned with enough heat intensity to kill most trees, although locations with sparse fuels or near moist environments experienced varied mortality rates by tree species. Although much of the trees were killed in the fire, impacts to soils on DNRC managed lands appear to be less severe.

Much of the DNRC managed lands involved in the Chippy Creek Fire exhibited complete duff consumption. The removal of duff and other organic material results in a higher erosion potential

until vegetation becomes reestablished. This is particularly relevant near Chippy Creek and Semem Creek. The steep terrace banks have a high erosion risk and a high delivery potential due to the proximity to streams.

One of the potential effects to soils from fire can be hydrophobic soils. Two types of hydrophobicity may occur:

- 1) An oven drying effect occurs on volcanic ash soils where surface soil is dried to the point that it is difficult to take on moisture, and
- 2) A physical alteration of the soil where particles are coated with a waxy film through the burning of organic material. Soil particles may begin to melt to a glassy texture.

During field reconnaissance after the fire, it was estimated that up to 50% of the DNRC managed lands exhibited the oven-drying effect typically found on volcanic ash soils. This type of water repellency is typically alleviated by light rain and morning dew. To date, a handful of light rain showers has fallen on the area and may have already alleviated this condition. No areas of physically altered soils were identified on state lands.

A second result associated with wildland fires is suppression impacts. Several control lines were constructed by dozers and by hand. These areas have been rehabilitated by recontouring the site and covering the disturbed area with woody debris along with constructing features to reduce the potential for soil erosion.

Past Management

Prior management activities occurred on all parcels in the project area. Table ST-2 summarizes the impacts by parcel.

Table ST-1: Management Impacts from Previous Entries

Parcel Name/Legal	Description of Past Management	Existing Impacts from Mgmt Activities
Semem Creek Parcel Sec 36, T24N, R27W	Majority of section was harvested during Big Prairie Timber Sale 2004-2007. Areas proposed for salvage will not be entered during this sale.	No past impacts from management in area proposed for salvage.
Chippy Creek Parcel Sec 6, T23N, R26W	This section was harvested in 1998-2000 as part of the Cook/Bear Timber Sale.	Past entries on the flat ground were "well designed with trails well spaced." (Nelson,

Figure SF-3: Cook Mtn Soils

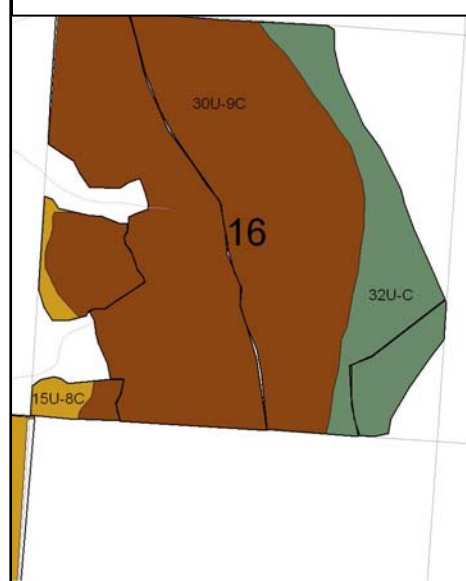


Figure SF-4: Marten Creek Soils

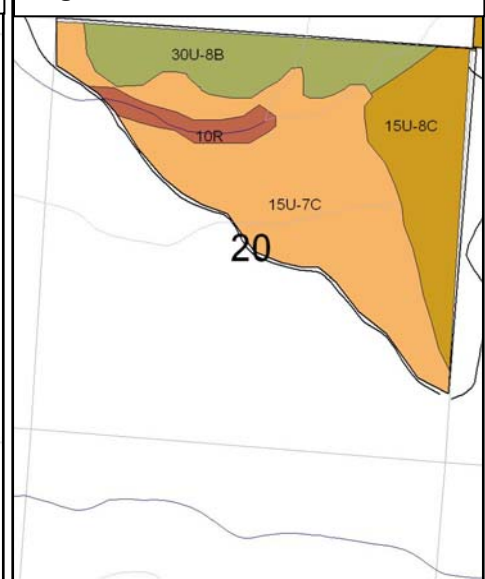
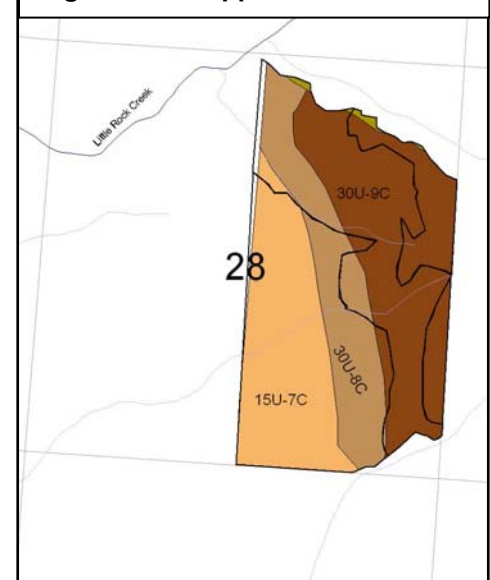


Figure SF-5: Upper Sears Soils



	Harvest occurred previously during the 1970's.	1997). No soils impacts from previous harvest were observed on the slope above Chippy Creek.
Marten Creek Parcel Sec 20, T23N, R26W	This area was last harvested in the early 1990's under the Marten Creek Timber Sale. Additional harvest entries occurred prior to the Marten Creek Timber Sale.	Field review indicates limited impacts from past entries. Skid trails were well spaced and are estimated (ocular estimation) to cover less than 10% of the area.
Cook Mountain Parcel Sec 16, T23N, R26W	The majority of this section was harvested in 1998-2000 as part of the Cook/Bear Timber Sale.	During field review, excavated skid trails were identified in this section. These were noted during the analysis for the Cook/Bear Timber sale, "Soil productivity in this unit has been affected by the presence of these excavated roads which occur approximately every 80 feet..." (Nelson, 1997). The Cook/Bear Timber Sale employed skyline cable yarding systems. This resulted in approximately 4 miles of road construction and line corridors spaced at 100-150 feet apart.
Upper Sears Gulch Parcel W½ Sec 28, T23N, R26W	Approximately 6mmbf was harvested from this parcel in the late 1940's and early 1950's	During field review, several roads and excavated skid trails were found on this parcel. No evidence of unstable soils or increased erosion was identified.

Cumulative Effects

Because no quantitative data exists to quantify the cumulative impacts to soils on the parcels involved in this salvage, I have chosen to display soil monitoring results on DNRC managed lands across the state. Cumulative effects from past and current uses on these parcels are limited to skid trails, roads and off-road trails from vehicles.

DNRC strives to maintain soil productivity by limiting cumulative soil impacts to 20% or less of a harvest area as noted in the State Forest Management Plan (DNRC, 1996). As a recommended goal, if existing detrimental soil effects exceed 15% of an area, proposed harvest should minimize any additional impacts. Harvest proposals on areas with existing soil impacts in excess of 20% should avoid any additional impacts and include restoration treatments as feasible, base on site-specific evaluation and plans. Past monitoring on DNRC timber sales from 1988 to 2003 has shown an average of 13.5% long-term soil impacts across all parent materials using all methods of harvesting (ground-based/cable yarding) (DNRC, 2004). These impacts range from 3% to 37.8% with a median of 9%. While no data for the monitoring report was collected from these parcels, ocular estimations during field review suggest impacts near or below the average.

While past results do not guarantee future impact levels, DNRC has demonstrated that through site specific requirements and contract administration that minimizing cumulative effects is possible and an effective method for maintaining productive timber sites.

ENVIRONMENTAL EFFECTS

Description of Alternatives

No Action Alternative

No timber harvest or associated activities would occur under this alternative.

Action Alternative

Eleven units totaling approximately 1120 acres would be harvested under the Action Alternative. Approximately 556 acres would be harvested using conventional ground-based equipment while the remaining 564 acres would be treated using cable methods. In addition, approximately 2.75 miles of new road would be constructed, 2.3 miles of road would be reconstructed and approximately 24 miles of road would be maintained or have minor drainage improvements installed as necessary to meet BMPs. Included in this would be the removal of two dilapidated log crossing structures, and the installation of a two culverts. Harvest may be completed under summer or winter conditions.

Direct and Indirect Effects

No Action Alternative

No timber harvest or associated activities would occur under this alternative. Erosion is expected to increase substantially in the first year after the fire on severely burned sites and decline as vegetation becomes reestablished. High erosion risk areas near Chippy Creek and Semem Creek will likely contribute sediment to the streams due to the steep terrain adjacent to the stream. As vegetation recovers and dead trees fall on the steep slopes, the sediment delivery potential will diminish greatly. Low and moderately burned areas will experience an increase in erosion potential but, duff and roots will serve to limit erosion.

Action Alternative

To provide an adequate analysis of potential impacts to soils, a brief description of implementation requirements is necessary. The Administrative Rules of Montana 36.11.422 (2) and (2)(a) state that appropriate BMPs shall be determined during project design and incorporated into implementation. To ensure the incorporated BMPs are implemented, the specific requirements would be incorporated into the DNRC Timber Sale Contract. As part of this alternative design, the following BMPs are considered appropriate and, therefore would be implemented during harvest operations:

- 1) Limit equipment operations to periods when soils are relatively dry, (less than 18% soil moisture), frozen or snow covered (12 inches packed or 18 inches unconsolidated) to minimize soil compaction and rutting, and maintain drainage features. Check soil moisture conditions prior to equipment start-up.
- 2) Mechanical falling may occur on previously identified slopes up to 55% where excessive soil disturbance can be avoided. Because the risk of excessive displacement increases as slopes increase over 50%, strict sale administration is critical. If disturbance becomes excessive, hand felling will be required.
- 3) Limit the distance the clipper (feller/buncher) travels outside of the corridor. Field review estimated the maximum distance traveled outside of the corridor would be 25 feet, assuming corridor spacing is 100 feet apart. (Schmalenberg, 2007)
- 4) On ground skidding units, the logger and sale administrator will agree to a general skidding plan prior to equipment operations. Skid trail planning would identify which main trails to use, and what additional trails are needed. Trails that do not comply with BMPs (i.e. draw bottom trails) would not be used and may be closed with additional drainage installed where needed or grass seeded to stabilize the site and control erosion.
- 5) Tractor skidding should be limited to slopes less than 40% unless the operation can be completed without causing excessive erosion. Short steep slopes above incised draws may require a combination of mitigation measures based on site review, such as adverse skidding to ridge or winch line skidding from more moderate slopes less than 40%. All cable yarding must have lift on the leading end of the log to limit soil disturbance.
- 6) Keep skid trails to 20% or less of the harvest unit acreage. Provide for drainage in skid trails and roads concurrent with operations.
- 7) In areas of moderate to high burn severity, contour fall 5-10 sub-merchantable trees per acre to limit soil disturbance, promote nutrient cycling and moisture retention.
- 8) Retain 10 to 15 tons large woody debris and a majority of all available fine litter feasible following harvest.

Considering data from the DNRC Soil Monitoring Report (DNRC, 2004), the implementation of Forestry Best Management Practices has resulted in less risk of detrimental soil impacts from erosion, displacement and severe compaction. While the report noted that the impacts were more likely on the fine textured soils and steep slopes, reduced soil productivity due to compaction and displacement may occur on coarser parent materials similar to those found in the state parcels. Also, the greatest impacts were noted where harvest implementation departed from BMPs such as limiting ground-based skidding to slopes of 40 percent or less.

Comparing the soil type map, field reconnaissance notes and topographic map features with the proposed harvest unit map indicates that under this alternative ground-based skidding would occur on slopes of up to 40%, on well-drained relatively rocky soils. The extent of impacts expected would likely be similar to those reported by Collins (DNRC, 2004), or approximately 12-14% of the harvest area. Potential impacts to soils from the cable yarding units would be less than 10% of the area. This level of impact assumes corridor spacing of at least 75 feet, and impacts generally confined to a 6-8 feet width. Potential impacts to soils from cable yarding units would generally be displacement although some compaction could occur. In addition, cable corridors pose a slight risk of routing water because the corridor is generally parallel to the fall-line of the slope. Areas with high erosion risk near Chippy Creek and Semem Creek will likely contribute sediment to the streams due to the steep terrain adjacent to the stream. As vegetation recovers and dead trees fall on the steep slopes, the sediment delivery potential will diminish greatly. Harvesting in these areas would increase the risk of erosion due to activity on the ground. This would be reduced by (1) maintaining a 66-foot no harvest buffer at the toe of the slope near Chippy Creek, (2) contour felling non-merchantable material to stabilize the slope, (3) restricting harvest operations to cable yarding, and (4) encouraging activities to periods of frozen ground. The area near Semem Creek would require full suspension yarding across the stream and SMZ.

In addition to the potential impacts from harvesting, approximately 10 acres would be taken out of production and converted to roads. Road construction would likely result in more erosion than native topography; however BMP implementation would minimize the risk of erosion. Because no stream crossings are proposed, the risk of delivering soil to watercourses would be very low. Table ST-3 summarizes the expected impacts to soils within harvest units.

Table ST-3: Expected acres of impact to soil from compaction and displacement

Harvest Method and Season	No Action Alternative	Action Alternative
Ground Based (12-14% of harvest area)	0	67-78 acres
Cable (10% of harvest area)	0	56 acres
Area removed from production due to road construction	0	10 acres
Total Area of Impacts (acres)	0	133-144
Total Harvest Acres	0	1120
Percent Area Impacted	0	11.8%-12.9%

Cumulative Soil Effects

Cumulative effects would be controlled by limiting the area of adverse soil impacts to less than 15% of harvest units (as recommended by the SFLMP) through implementation of BMPs, skid trail planning on tractor units and limiting operations to dry or frozen conditions. Future harvest opportunities would likely use the same road system, skid trails and landing sites to reduce additional cumulative impacts. Large woody debris would be retained for nutrient cycling long-term soil productivity.

Some of the area proposed for harvest under this alternative have been harvested in the past using ground based harvest methods. In order to limit cumulative impacts, existing skid trails would be used if they are properly located and adequately spaced. By reusing existing skid trails and mitigating the direct and indirect effects with soils moisture restrictions, season of use and method of harvest, the risk of unacceptable long-term impacts to soil productivity would be low.

REFERENCES:

DNRC, 2004. DNRC Compiled Soils Monitoring Report on Timber Harvest Projects. Missoula, MT.

DNRC, 1996. State Forest Land Management Plan. Montana Department of Natural Resources and Conservation. Missoula, MT.

Collins, Jeff and Ottersberg, R. 1985. Plains Unit Soil Survey. Montana Department of State Lands. Missoula, MT.

Nelson, Tony, 1997. Cook/Bear Timber Sale Soils Assessment. Montana Department of Natural Resources and Conservation, Northwestern Land Office. Kalispell, MT.

Schmalenberg, Jeff 2007. Interoffice Memo summarizing field observations and recommendations for the Cook Mountain Salvage Timber Sale.

WILDLIFE ANALYSIS

INTRODUCTION

The analysis in this section pertains to wildlife species and their habitat in the existing environment and foreseen changes— in terms of direct, indirect, and cumulative effects - to the environment due to each alternative (Action vs. No Action). During the initial scoping, no issues were identified by the public regarding wildlife impacts. Several issues were expressed from internal discussions regarding the potential effects of the proposed timber harvesting, and these will be identified under each species discussed.

Description of Alternatives

No Action Alternative

No timber harvest or associated activities would occur under this alternative.

Action Alternative

Eleven units totaling approximately 1,120 acres would be harvested under the Action Alternative, with prescriptions generally targeting merchantable trees killed by the Chippy Creek Fire. Approximately 2.75 miles of new road would be constructed; 2.3 miles of road would be reconstructed.

METHODS

DNRC promotes biodiversity by taking a “coarse-filter” approach to wildlife habitat management, favoring an appropriate mix of stand structures and compositions on State lands (ARM 36.11.404). Appropriate stand structures are based on ecological characteristics (e.g. land type, habitat type, disturbance regime, unique characteristics). A coarse-filter approach assumes that if landscape patterns and processes are maintained similar to those with which wildlife evolved, then the full complement of species will persist and biodiversity will be maintained. The coarse-filter approach supports diverse wildlife populations by managing for a variety of forest structures and compositions that approximate historic conditions across the landscape.

Because some species have specialized needs, DNRC also employs a “fine filter” approach for threatened, endangered, and sensitive species (TES species), focusing on these species’ specific habitat requirements (ARM 36.11.406). These species are sensitive to human activities, have special habitat requirements that might be altered by timber management, or currently are or might become listed under the Federal Endangered Species Act. Because TES species usually have specific habitat requirements, consideration of their needs serves as a useful “fine filter” for ensuring that the primary goal of maintaining healthy and diverse forests is met.

To assess the existing condition of the project area and the surrounding landscape, a variety of techniques were used. Data to assist in evaluations were obtained from field visits (Aug. 15 & 20 and Sept. 5 & 18), scientific literature research, DNRC’s Stand Level Inventory (SLI) data, MT Natural Heritage Program data, aerial photographs, consultations with other wildlife professionals (esp. D. Wroblewski, USFS District Biologist for Plains/Thompson Falls District of the Lolo National Forest), and professional judgment. To assess effects to wildlife species, existing habitat was defined, and then the changes to habitat quality and quantity resulting from each alternative was discussed.

The proposed alternatives were analyzed at two spatial scales. The first scale, used for assessing direct and indirect effects, occurred at the project level, which consists of DNRC lands within the following sections: Sections 6, 16, 20, and 28 of Township 23N, Range 26W, and Section 36 of Township 24N, Range 27W. The second scale of analysis relates the project-level analysis to the surrounding landscape to assess cumulative effects of each alternative on a larger spatial scale. This scale varies according to the species being discussed, but generally encompasses the watersheds in which the project area lies, or the area that would be available to one or more breeding pairs of individuals, given their movement capabilities. In the cumulative effects analysis area, all prior actions on all ownerships were considered in the current condition, and the effects of this project and foreseeable future DNRC actions were considered and discussed.

COARSE FILTER--

Issue: There are concerns that harvesting dead and dying trees may disturb and/or physically alter habitat for wildlife, which may adversely affect some species.

Existing Environment:

The project areas consists of 5 scattered sections of DNRC managed lands in the eastern part of the Thompson River drainage. Lands in the area are managed by mixed owners-- the lower elevations are a combination of DNRC and private industrial forest lands, whereas the higher elevations are predominately managed by the Lolo National Forest. The mix of ownerships has created a variety of habitats for wildlife species, with relatively undisturbed forests on parcels managed by the Lolo, which are available for species that rely more heavily on mature forests, and intensively harvested forests on private sections which provide habitat for species that use early seral stages either seasonally or exclusively.

Of the 2,862 acres in the sections within the project area, 1,337 acres burned in the Chippy Creek Fire, at stand-replacement intensity and moderate intensities. Thus, nearly half of the project area is now at the earliest of seral stages. Throughout the burned portions of this project area, as well as the entire Chippy Creek Fire area (>99,000 acres total), snag densities are very high and overstory canopy cover and understory vegetation are reduced to minimums. As a result of the fire, much of the project area has been dramatically altered from its previous condition. For wildlife species that are associated with dense forest canopies and/or understory, habitat quality and quantity in the project area have been dramatically altered and are no longer suitable. Conversely, new habitat has been created for species that use post-fire and/or more open habitats.

Direct and Indirect Effects—Coarse Filter:

Effects of No Action Alternative:

This alternative would retain all the dead wood (snags and downed wood) that resulted from the fire. This material would provide foraging and nesting sites for a host of cavity nesting species. Through time, species use of the area would change based on the development of understory and overstory tree species. The dead wood created by the fire would remain standing as snags or fall to the ground and provide habitat for a variety of mammal, bird, reptile, and amphibian species.

Effects of Action Alternative:

Under this alternative, a considerable amount of snags would be removed from the project area in the proposed salvage units. The effects would include a reduction in habitat for species that forage and nest in recently burned stands (Hutto and Gallo 2006), which may decrease the diversity and/or the density of wildlife species. Mitigation measures that are discussed further in this analysis, including snag retention and retention of 217 acres of unharvested burned forest, would help to ensure that some snags and downed woody material would be available for a variety species to use both in the shorter term and as the stands regenerate.

Cumulative Effects—Coarse Filter:

Effects of No Action Alternative:

Under this alternative, no salvage harvests would occur on DNRC lands within the project area. Other land owners within the fire perimeter include: Flathead Agency (~32,000 acres), Lolo National Forest (~47,000 acres), and private landowners (~17,000 acres, much of which is owned by private industrial timber companies). Salvage harvests are expected to occur on most if not all of the private industrial timber lands and on much of the Tribal lands, and perhaps on some of the Forest Service lands within the fire area. However, much of the burned acreage will likely remain unsalvaged, continuing to provide considerable amounts of habitat for fire-associated wildlife species. Under the No Action Alternative, DNRC would not contribute to any effects of salvage harvesting beyond what other landowners' actions may have.

Effects of Action Alternative:

Most of the burned lands on DNRC managed sections on the west side of the Chippy Creek Fire would be salvage harvested under this alternative. The effects of the harvests, in terms of the entire fire, would remove snags on 1,120 acres of DNRC lands, which comprise <2% of the area burned by the Chippy Creek Fire. These actions would be in addition to salvage activities that are expected to occur on much of the Tribal and private timber company lands. Because of the small amount of acreage the DNRC proposes to harvest, the cumulative effects of the proposed salvage on species that utilize burned habitats will be minimal, even when added to potential salvage on other ownerships within the fire perimeter. In terms of species that utilize more densely forested habitats, the effects of the salvage harvest would be minimal when added to the effects from the fire.

FINE FILTER--

THREATENED AND ENDANGERED SPECIES

➤ **Canada Lynx (*Lynx canadensis*)**

Issue: Timber harvesting and removal of coniferous cover and downed wood can reduce the suitability of lynx denning and foraging habitats, which could reduce their ability to inhabit an area.

Existing Environment and Environmental Effects:

Canada lynx are associated with subalpine fir forests, generally between 4,000 to 7,000 feet in elevation in western Montana (Ruediger et al. 2000). Primary lynx habitats are subalpine-fir types with abundant coarse woody debris for denning; however, lynx will use a mix of species compositions (subalpine fir, lodgepole pine, Douglas-fir, grand fir, and western larch). Lynx forage preferentially on snowshoe hares, which are found both in densely stocked young coniferous forests and in mature, dense forest. Mature forest habitats containing dense horizontal structure facilitate movement and provide denning habitat.

The proposed project area is mostly comprised of drier forest types not typically used by lynx. Because of the south-westerly aspects, lower elevations, and drier forest types in the project area and surrounding drainages, lynx are not expected to use the area. Therefore, direct, indirect, and cumulative effects to Canada lynx would not be expected as a result of either alternative and this species will not be discussed further.

➤ **Grizzly Bear (*Ursus arctos*)**

Issue: Timber harvesting and associated activities can potentially displace grizzly bears from important habitats and reduce security by reducing hiding cover and visual screening and/or by increasing road densities.

Existing Environment and Environmental Effects:

Grizzly bears are wide-ranging mammals that use forested upland habitats. Preferred grizzly bear habitats are meadows, riparian zones, avalanche chutes, subalpine forests, and big game winter ranges, all of which provide seasonal food sources. The proposed project area is >8.5 miles southeast of the Cabinet/Yaak Recovery Zone (USFWS 1993) and is outside of occupied habitat (Wittinger 2002). There have been no documented observations of grizzly bears in the general vicinity of the proposed project area in recent years (D. Wroblewski, USFS, pers. comm. Sept. 2007). Although grizzly bears could potentially be found in the proposed project area, extensive use is unlikely given the marginal grizzly bear habitat values existing in the project area. Project activities are not expected to substantially alter habitat from its existing condition such that grizzlies would not be able to use it in the future if the area were to become inhabited (e.g. open road densities will not increase, and visual screening will not be substantially altered, as screening is already poor in the post-fire area). Thus, no direct, indirect, or cumulative effects would be expected under either alternative, and this species will not be discussed further.

➤ **Gray Wolf (*Canis lupus*)**

Issue: Timber harvesting activities have the potential to affect wolves directly (e.g. human disturbance near dens and/or rendezvous sites), and/or indirectly (e.g. reduce prey abundance through habitat alteration).

Existing Environment and Environmental Effects:

The wolf is a wide-ranging species that occupies a wide range of vegetation community types, which possess adequate prey and low potential for wolf/human encounters or disturbance, especially at den and/or rendezvous sites. Wolves in northwest Montana typically den in late April, choosing elevated areas in gentle terrain near a water source, close to meadows or other openings, and near big game wintering areas for dens and rendezvous sites. Primary prey species in northwest Montana are white-tailed deer, elk, moose, and mule deer, and wolf distribution is strongly associated with white-tailed deer winter range.

The proposed project is in the Northwest Montana Recovery Zone, as identified by the Northern Rocky Mountain Wolf Recovery Plan (USFWS 1987). The project area is located between the home ranges of two packs (~8.5 miles SE of the Fishtrap Pack and ~4 miles west of the Thompson Peak Pack). The Chippy Creek Fire burned a portion of the Thompson Peak Pack's home range. Wolves have been documented near the proposed project area (K. Laudon, MTFWP, pers. comm., Sept. 2007).

The Cook Mountain Salvage project area includes portions of big game winter ranges for elk, white-tailed deer, and moose. However, because the fire removed the vegetation extensively in the project area, and the project area is outside of the documented home ranges and usage areas for the nearest wolf packs, denning and/or rendezvous sites are not expected in the project area. Additionally, because of the loss of vegetation cover, the proposed action is not expected to result in measurable effects to big game species beyond those appreciable effects caused by the large, intensive wildfire. Open road densities will remain the same. Therefore, negligible effects on wolves are expected under either alternative.

Mitigations for Wolves:

- *Suspend operations and temporarily restrict use of roads within a 1-mile radius of any known active wolf dens*
- *Suspend operations and consult with a DNRC biologist if suspected rendezvous site or den is observed within 0.5 mile of any ongoing project activities (DNRC biologist will check with FWP wolf specialist prior to beginning summer harvest activities to ensure that no known dens or rendezvous sites are present in areas that could be affected by harvests)*
- *Close unnecessary roads and skid trails after the proposed activities to reduce the potential for motor vehicle disturbance and wolf/human conflicts.*

SENSITIVE SPECIES

Table W-1 lists species considered sensitive by the DNRC on the Northwest Land Office, and shows whether each sensitive species was either included in the following analysis or was removed from further analysis due to lack of habitat availability. Also, a search of the Montana Natural Heritage Program Database was conducted, which documented no occurrence records in the proposed project area or within a 4 mile radius of any of the proposed harvest sections for species that the DNRC considers “sensitive.” However, their data did note that the Cabinet, Salish, and Purcell mountain ranges have relatively continuous habitat for wolverines (considered sensitive by the USFS), and that there have been observations and harvests of wolverines in these mountain ranges over the past several decades. Because wolverines are a wide-ranging species, and because the proposed salvage harvest would take place in less than ideal habitat for wolverines, no direct, indirect, or cumulative effects would be expected under either Alternative.

Table W-1. Status of sensitive species for the DNRC’s Northwest Land Office in relation to the proposed Cook Mountain Salvage project. No direct, indirect, or cumulative effects of either Alternative were expected for species for which no further analysis was conducted.

Species	Determination & Basis
Bald eagle	No further analysis conducted— see note below.
Black-backed woodpecker	Included — Suitable recently-burned habitats occur in the project area.
Coeur d’Alene salamander	No further analysis conducted—No moist talus or streamside talus habitat occurs in the project area.
Columbian sharp-tailed grouse	No further analysis conducted—No suitable grassland communities occur in the project area.
Common loon	No further analysis conducted—No suitable lake habitats occur within the project area.
Fisher	Included —Potential fisher habitat occurs in the proposed project area.
Flammulated owl	Included —Suitable dry ponderosa pine habitats occur within the project area.
Harlequin duck	No further analysis conducted— No suitable high-gradient stream or river habitats occur in the project area.
Northern bog lemming	No further analysis conducted—No suitable sphagnum bogs or fens occur in the project area.
Peregrine falcon	No further analysis conducted—No suitable cliffs/rock outcrops occur in the project area.
Pileated woodpecker	Included —Western larch/Douglas-fir/Ponderosa pine habitats occur in the project area.
Townsend’s big-eared bat	No further analysis conducted—No suitable caves or mine tunnels occur in the project area.

➤ **Bald Eagle (*Haliaeetus leucocephalus*)**

Issue: Timber harvesting could reduce bald eagle nesting and perching habitats and/or disturb nesting bald eagles.

Existing Environment:

Bald eagles are diurnal raptors associated with significant waterbodies such as rivers, lakes, and coastal zones. The bald eagle diet consists primarily of fish and waterfowl, but includes carrion, mammals, and items taken from other birds of prey. In northwestern Montana, bald eagles begin the breeding process with courtship behavior and nest building in early February; the young fledge by approximately mid-August, ending the breeding process. Preferred nest-stand characteristics include large emergent trees that are within site distances of lakes and rivers and screened from disturbance by vegetation.

No eagle nests are located in the proposed project area. The nearest bald eagle nest occurs approximately 13 air miles east on the Upper Dry Fork Reservoir. The Thompson River runs through the southeastern corner of Section 36 and nearly borders Section 6. Bald eagles have been documented along the Thompson River and are known to use the River in winter (D. Wroblewski, personal communication, Sept. 2007), though they are not known to use the proposed harvest areas. Occasional use of the proposed project area by foraging bald eagles may occur, especially in the winter when eagles are more dependent upon big game carrion. Overall, habitats found within State parcels and the surrounding vicinity have low to moderate inherent values for bald eagles. No localized or cumulative effects that would positively or negatively affect bald eagles would be expected to occur as a result of either alternative. Therefore, this species will not be considered further in this analysis.

Mitigations for Bald Eagles:

- *Cease all operations and consult with a DNRC biologist for further mitigations should an eagle nest be observed within 1 mile of any project-related activities*

➤ **Black-backed Woodpeckers (*Picoides arcticus*)**

Issue: Timber harvesting in recently burned areas can affect black-backed woodpeckers by reducing nesting and/or foraging habitats.

Existing Environment:

The black-backed woodpecker uses recently burned forest stands for foraging and nesting. Black-backed woodpeckers are primary cavity-nesters that use recently burned forest stands for foraging and nesting. They forage extensively on moderately to heavily burned conifers, excavating larval wood-boring beetles that invade after moderate to high intensity fires. Black-backed woodpeckers nest most often in Douglas-fir, western larch, and ponderosa pine trees, and avoid nesting in lodgepole pine (Hejl and McFadden 1998). Courtship and territory establishment begin in approximately mid-April; eggs are incubated for ~2 weeks and chicks fledge ~25 days later. In western Montana, most chicks will have fledged by early-July (J. Woolf, Univ. Montana, pers. comm. Sept. 2007).

Approximately 1,328 acres on DNRC forested lands burned on the west side of the Chippy Creek Fire, with most burning occurring at moderate to stand-replacement intensity. The majority of the burned area is considered black-backed woodpecker habitat (e.g. stands >40 acres with at least 40 trees per acre with ≥9" dbh).

For cumulative effects, all lands affected by the Chippy Creek Fire were considered, as these are the bulk of potential black-backed woodpecker habitat available on the Plains unit.

Direct and Indirect Effects to Black-backed Woodpeckers

Effects of the No Action Alternative:

Under this alternative, all snags would remain on the project area and would provide foraging and nesting habitat for black-backed woodpeckers. Black-backed woodpeckers would be expected to use the burned area heavily for at least 4 years and up to 8 years following the fire (Kotliar et al. 2002). Thus, negligible effects to black-backed woodpeckers would be expected.

Effects of the Action Alternative:

Under the Action Alternative, approximately 1,120 acres of burned, suitable black-backed woodpecker habitat would be harvested. This Alternative is expected to greatly decrease the amount and/or quality of foraging and nesting habitats in the project area, resulting in the potential for a decrease in the number of reproductive pairs in the project area. According to Hutto and Gallo (2006), adequate amounts of foraging habitat appear to be the limiting factor to black-backed woodpecker populations where salvage harvesting takes place, even if appropriate snags for nesting are retained. Hutto (1995) recommends leaving some large patches of untouched burned forest to provide foraging habitat, which is consistent with the standard mandated by ARM 36.11.438(b), which requires the DNRC to retain 10% of the burned area in an unharvested condition. Under this Alternative, 217 acres of upland habitat (16.2% of the burned acreage in addition to the unharvested areas within SMZ's) would not be harvested (see Figure W-2). Most of these acres would be in the higher elevations and/or less accessible ground within the project area, and most would be located adjacent to Forest Service lands that will not be harvested (D. Wroblewski, per. Comm.. Sept 2007), helping to maintain more contiguous

blocks of habitat and providing confidence that these areas will not be disturbed by firewood gatherers or other activities.

Timing restrictions to minimize disturbance and direct impacts to nest trees during the black-backed nesting season (April 15-July 1) would be enacted on the “Cooked Mountain” portion of the project area (i.e. units in sections 16, 6, and 36), pursuant to ARM 36.11.438(a). However, to off-set the potential loss of value of ponderosa pine trees to “blue-stain” in the “Seared Gulch” portion of the project area (i.e. Sections 20 and 28), would implement an Alternative Practice that would allow harvesting and associated activities to occur during the nesting season. By allowing harvesting to continue during the nesting season, minor direct and indirect effects to black-backed woodpeckers could occur. Harvesting actions could potentially affect up to 577 acres of black-backed woodpecker habitat on the Seared Gulch sale. As black-backed woodpeckers have been observed nesting in densities of approximately 0.9 nests/100 acres in similar habitat types (Hutto and Gallo 2006), the effects of harvesting during the nesting season could potentially affect approximately 5-6 nesting pairs of black-backed woodpeckers. However, as harvesting activities should have started at least two months prior to the onset of the nesting season, much of this acreage will have already been harvested and thus no longer be appropriate habitat for birds to select for nesting. Thus the potential number of nesting pairs that could be affected would be reduced. Furthermore, because harvesting is expected to take place on neighboring sections of private timber lands prior to the nesting season, the general area will most likely not be appealing habitat for black-backed woodpeckers. Thus, there is a slight risk of direct effects to a small number of nesting pairs of black-backed woodpeckers in the remaining portions of sale units that would be harvested during the nesting period, and indirect effects to black-backed woodpeckers resulting from the eventual loss of 1,120 acres of foraging habitat.

Cumulative Effects to Black-backed Woodpeckers

Effects of the No Action Alternative:

The Chippy Creek Fire produced large amounts of black-backed woodpecker habitat within the 99,000 acre fire perimeter. Under this No Action Alternative, the DNRC would not contribute to any loss of black-backed woodpecker habitat due to salvage logging. Across the Chippy Creek Fire, salvage harvests are expected to occur on most of the private industrial timber lands and Tribal lands affected by the fire (~15% and ~30% of the fire area, respectively). National Forest lands, which make up ~50% of the fire area, may be salvaged to a small degree. Thus, as much as 50% of the Chippy Creek Fire area could be salvaged logged, though that would still leave approximately 50,000 acres of burned forest (in varying degrees of burn severity). Under the No Action Alternative, the DNRC lands (<1% of the fire area), would not contribute to the amount of lands affected by the salvage activities.

Effects of the Action Alternative:

The additive impacts of the proposed DNRC harvest will result in <2% of the fire area being harvested—a minimal amount of the total burned habitat. Although extensive salvage harvesting is expected to occur on much of the private timber company and tribal lands within the fire area, the majority of the Forest Service lands affected by the fire (~47,000 acres) will remain unharvested (D. Wroblewski, Lolo National Forest, pers. comm. Sept. 2007). According to Samson (2006), this represents enough habitat to support a viable population of black-backed woodpeckers. Combined with the expected

salvaging on other ownerships, the DNRC's actions would add to the loss of black-backed woodpecker foraging and nesting habitat within the area affected by the Chippy Creek Fire. However, due to the sizable area burned in the Chippy Creek wildfire, including many areas not likely to receive salvage harvest, the overall cumulative impact of the proposed harvest on black-backed woodpecker habitat would be minimal.

Mitigations for Black-backed Woodpeckers:

- *Retain at least 10% of the burned acreage on DNRC lands in an unharvested condition that is broadly representative of the entire burn and in relatively contiguous blocks, favoring close proximity to unharvested fire-killed deferred stands on neighboring ownerships (see Figure W-2)*
- *Minimize mechanize activities (including restricting harvesting) on the Cooked Mountain Salvage sale (Sections 6, 16, & 36) during the black-backed woodpecker nesting season (April 15- July 1)*
- *Make efforts to have contractors complete the road construction and start logging near the leave patches in Section 28 (Seared Gulch sale) as soon as possible, in an effort to minimize any disturbance near those leave patches once the nesting season commences*

➤ **Flammulated Owl (*Otus flammeolus*)**

Issue: Timber management practices that would reduce the availability of mature ponderosa pine or cavity producing trees (snags) may reduce flammulated owl habitat.

Existing Environment:

Flammulated owls are small, migratory, insectivorous forest owls that inhabit old, open stands of warm-dry ponderosa pine and cool-dry Douglas-fir forests in the western United States. These owls are secondary cavity nesters, usually nesting in cavities excavated by pileated woodpeckers or northern flickers in large aspen, ponderosa pine, or Douglas-fir trees or snags. Nesting typically occurs in stands with moderate canopy closure (30-50%) with at least 2 canopy layers (MCallum 1994). Flammulated owls feed on moths and other insects, and thus need fairly open forests in which to forage.

Much of the proposed project area consists of ponderosa pine, western larch, and Douglas-fir. Before the fire, SLI data indicated a total of 2,215 acres of potential flammulated owl habitat in the project area; 854 acres of that were affected by the fire. Sizeable snags (>15") occur throughout the project area at relatively high densities in the areas affected by the recent fire. In areas that burned with high intensity, the canopy cover is most likely too open for Flammulated owls. However, areas of moderate burn intensities may still have adequate Flammulated owl habitat, and the fire effectively removed much of the dense Douglas-fir dominated mid- and understory, thus improving Flammulated owl foraging opportunities. Most stands are expected to regenerate to a stands of warm-dry ponderosa pine and cool-dry Douglas-fir forests that Flammulated owls prefer.

Direct and indirect effects of salvage harvesting were considered at the scale of the project area. Cumulative effects were analyzed within an expanded area containing the watersheds associated with the project area, including all lands in the Semem, Chippy, Bear, Marten, and Little Rock Creek drainages, from the 5,000' contour to their confluences with the Little Thompson River (see Figure W-1).

Direct & Indirect Effects to Flammulated Owls

Effects of the No Action Alternative:

No harvesting activities would disturb nesting birds or remove snags and potential nesting/roosting trees. Flammulated owls would not likely be found in the burned portions of the project area for the next several decades, except perhaps in the mixed-severity patches where canopy cover is at least 30%. However, owls that live in nearby unburned areas may benefit from the open burned areas for foraging opportunities.

Effects of the Action Alternative:

The proposed harvest would remove many of the dead trees in the project area. However, large snags, live trees, and snag replacement trees would be retained, with favor given to ponderosa pine, larch, and larger Douglas-fir trees, all of which can make good nest trees for flammulated owls. As stands regenerate and the canopy closes, the remaining snags and snag recruits should provide excellent nesting and perching opportunities in the future (approx. 50 years). Because the emphasis of this alternative is on removing dead trees from intensively burned areas that currently do not provide habitat, and areas burned at low to moderate intensity would receive relatively light selective treatment, minimal adverse effects to flammulated owls would be anticipated. Also, the activity restriction period would minimize disturbance to nesting pairs that may be in the area, and longer term effects would be minor because at least 2 large snags would be retained per acre in all treated areas regardless of burn intensity, which would maintain potential nesting sites over time in the project area.

Cumulative Effects to Flammulated owls

Effects of the No Action Alternative:

Much of the flammulated owl habitat in the analysis area was affected by the Chippy Creek Fire, and thus may not be appropriate habitat for the next several decades until the canopy re-develops and closes in. Additionally, recent timber extractions on unburned private parcels in the analysis area have reduced live tree and snag densities below acceptable limits for flammulated owls. Thus, the amount of flammulated owl habitat is currently low across the analysis area. However, flammulated owls are associated with fire-adapted tree species, and thus the burned areas are expected to regenerate into good conditions for flammulated owls in the future.

Effects of the Action Alternative:

Under this Alternative, some potential nesting snags would be removed from the burned DNRC lands in the cumulative effects analysis area. These actions, combined with the likely removal of snags on other ownerships within the burned acres of the analysis area, would not substantially decrease the current amount of flammulated owl habitat, as this was severely reduced by the fire. However, the removal of snags could reduce future nesting trees, once the stands begin to regenerate to habitats appropriate for flammulated owls (~50+ years). Because appropriate flammulated owl habitat still exists on some of the unburned areas within the cumulative effects analysis area, and because the effects of the timber salvage would remove potential future nest trees from only a small percentage of the analysis area, any cumulative effects of salvage harvest should be negligible.

Mitigations for Flammulated owls:

- Follow snag retention protocols set by ARM 36.11.411, retaining an average of at least 2 snags and 2 snag recruits >21" dbh (or the next largest size available) per acre of harvested land (or additional snags if snag recruits are not available)
- Favor ponderosa and larch, then Douglas-fir snags; favor clumping snags where possible, and retaining snags >200 yards from open roads
- Retain occasional dense patches of conifer regeneration and shrubs if available.

➤ **Fisher (*Martes pennanti*)**

Issue: Timber harvesting and related activities might affect fishers by altering habitat and/or by increasing their susceptibility to trapping.

Existing Environment:

The fisher is a medium-sized mammal belonging to the weasel family that uses mature and late-successional habitats. Forest management considerations for fisher involve providing for resting and denning habitats near riparian areas while maintaining travel corridors. Fishers are generalist predators and use a variety of habitat types, but are disproportionately found in stands with dense canopies. In the Rocky Mountains, fisher prefer late-successional coniferous forests for resting sites and tend to use areas within 150 feet of water more than their availability on the landscape (Powell and Zielinski 1994). Such areas typically contain large live trees, snags, and logs, which are used for resting and denning sites and dense canopy cover, which is important for snow intercept (Jones 1991).

Before the Chippy Creek Fire, modeling using the SLI data identified approximately 1,110 acres within the proposed project as fisher habitat. Characteristics of these stands that identified them as potential fisher habitat included the cover type as well as elevation (<6,000 ft), the presence of sawtimber, and stocking densities (moderate to well-stocked). The fire affected 279 acres of fisher habitat, essentially reducing the canopy and stocking densities below ranges that would make these areas suitable for fishers. Within the project area there are approximately 2.7 miles of Class I streams, 0.8 miles of which lie within the fire perimeter (no Class 2 streams). The unburned portions of the stream corridors could provide habitat for fishers at present. However, given the high degree of management in riparian and upland habitats on non-DNRC lands in the lower elevations, and the effects of the Chippy Creek Fire in the upper elevations, little use of these streams is expected from fishers until the area is able to regenerate over the course of several decades.

To assess cumulative effects, an analysis area was defined that included a 33,125 acre area encompassing the Semem, Chippy, Bear, Marten, and Little Rock Creek drainages, from their confluences with the Little Thompson River to the 6,000' elevation line (see Figure W-1). The fire affected 22,137 acres (66.8%) of the analysis area, the majority of which burned at a stand-replacement intensity. Of the remaining unburned acres, suitable fisher habitat appears limited. Uplands within the unburned analysis area are largely drier ponderosa pine and Douglas-fir/western larch types that are not typical fisher habitats. Furthermore, extensive areas on private industrial timber lands within the analysis area have been harvested in the last 30 years, reducing the potential of

fisher use. Landscape connectivity within riparian areas is limited, and although forested corridors exist, many are likely too small to facilitate appreciable fisher movement.

Direct and Indirect Effects to Fishers:

Effects of the No Action Alternative:

Under this Alternative, all snags would be retained in harvest units. The larger snags could provide resting sites when canopy cover is re-established. Additionally, coarse woody debris would be expected to increase in the harvest areas, thereby increasing the amount of denning and resting habitats in the distant future (50+ years). In the nearer term (10-30 years), foraging opportunities would return when regeneration establishes. The Chippy Creek Fire consumed fisher habitat in the burned portions of the project area. Therefore, fishers are not expected to use the burned area to any large extent. The No Action Alternative would not result in any measurable effects to fishers.

Effects of the Action Alternative:

Under the Action alternative, harvests of snags and dead wood on the uplands would reduce the amount of structure (in terms of standing and/or fallen dead trees) that would be available once the stands begin to regenerate and develop into fisher habitat (50+ years). However, snags and snag replacements will be retained across the upland harvest areas. Measures to protect Streamside Management Zones (SMZs) would aid in providing for greater densities of woody material in the riparian areas, which fishers use preferentially, and would adhere to ARM 36.11.441(b)(iii) which specifies that DNRC shall consider maintaining an abundance of large snags and CWD within 100 ft of Class 1 streams following a large-scale stand replacement disturbance event. Particularly, the Alternative would maintain a 66 ft no-cut buffer around Semem and Chippy Creeks, with selective tree removal in the remainder of the 100 ft (see Hydrology and Fisheries Analysis). These mitigations will be more likely to benefit fishers in the longer term, as much of the riparian areas burned intensely enough to be considered non-habitat for fishers. Additionally, any roads created during the project will be closed to vehicular traffic after project completion, which should result in no net increase in accessibility for trappers in the area. The effects to fishers are expected to be negligible under this alternative because the proposed project would not substantially influence current or future fisher use of the project area.

Cumulative Effects to Fishers

Effects of the No Action Alternative:

The burned portions of the cumulative effects analysis area, combined with the heavily-harvested unburned private lands in the area, would remain in relatively poor fisher habitat until sufficient regeneration occurs over the next several decades. Under the No Action Alternative all snags and coarse woody debris on DNRC lands in the analysis area would be retained, though snags would most likely be removed from private timber lands in the analysis area. As the area regenerates, the remaining snags, logs, and surviving large trees that were not salvaged would be expected to result in young forests that contain some characteristics commonly associated with older forests, which may appeal to fishers (Jones and Garton 1994). Road access on DNRC lands within the analysis area would not be changed with the No Action Alternative; thus fisher vulnerability to trapping would remain unchanged.

Effects of the Action Alternative:

Under this alternative, much of the dead and standing wood would be removed from DNRC lands, or approximately 3.5 % of the cumulative effects analysis area. Salvaging would most likely occur on private timber lands as well (approx. half of the burned acreage within the cumulative effects area). The removal of this material would reduce the densities of snags and logs that will remain on the landscape over the next several decades. Retention protocols on DNRC lands would ensure more dead wood would be retained in the riparian and unharvested areas than in the proposed harvest units, and much of the analysis area will most likely not be salvaged, especially in riparian areas. The density of open roads will not increase on DNRC lands in the cumulative effects analysis area; however, some increases in road densities may occur on a few parcels of other-ownership. Longer-term localized effects in the harvest units are expected, but due to the large abundance of non-habitat for fishers in the analysis area and the fact that open road densities will not increase on DNRC lands, the cumulative effects of this Alternative are expected to be negligible.

Mitigations for Fishers:

- *Give consideration to maintaining an abundance of large snags and coarse woody debris within 100 ft of Class 1 streams.*
- *Follow snag retention protocols set by ARM 36.11.411, retaining an average of at least 2 snags and 2 snag recruits >21" dbh (or the next largest size available) per acre of harvested land (or additional snags if snag recruits are not available)*
- *Close roads and skid trails opened with the proposed activities to reduce the potential for unauthorized motor vehicle use.*

➤ **Pileated Woodpecker (*Dryocopus pileatus*)**

Issue: Timber harvesting and related activities may reduce the quality and quantity of pileated woodpecker nesting and foraging habitat.

Existing Environment:

Pileated woodpeckers are closely associated with mature and late successional forest communities at low to mid elevations. The pileated woodpecker plays an important ecological role by excavating cavities that are used in subsequent years by many other species of birds and mammals. Preferred nest trees for pileated woodpeckers are western larch, ponderosa pine, black cottonwood, and quaking aspen, usually 20 inches dbh and larger. Pileated woodpeckers primarily eat carpenter ants and other insects, which inhabit large downed logs, stumps and snags. Nesting habitat consists of mature stands below 5,000 feet in elevation that are 50-100 contiguous acres in size, with 100-125 square feet per acre of basal area and a relatively closed canopy (Aney and McClelland 1985).

Potential pileated woodpecker nesting habitat was identified by searching the SLI database for Old stands (>150 years old) with >100 square feet per acre basal area, >40 percent canopy cover, and below 5,000 feet elevation. Based on these parameters, approximately 1,691 acres of potential nesting habitat for pileated woodpeckers existed prior to the fire on the project area. About 802 acres were affected by the burn, which essentially turned those areas into non-nesting habitat by removing the closed canopy. Some foraging opportunities are probably available in the burned areas, and 2900 acres

of non-burned habitat within the project area could still provide nesting habitat for pileated woodpeckers.

Direct and indirect effects were analyzed and described at the project level. Cumulative effects were analyzed within an expanded area including the watersheds associated with the project area, including all lands in the Semem, Chippy, Bear, Marten, and Little Rock Creek drainages, from the 5000' contour to their confluences with the Little Thompson River (see Figure W-1).

Direct and Indirect Effects to Pileated Woodpeckers:

Effects of the No Action Alternative:

This Alternative would retain all live trees and the snags produced by the fire. Thus no effects to pileated foraging habitat would be expected. Pileated woodpeckers are not expected to use the burned area extensively, though some foraging use might occur in burned areas over time.

Effects of the Action Alternative:

If disturbance to feeding sites occurs under the Action Alternative, any individual using the area is expected to move to an unaffected area nearby. Therefore the direct effects to pileated woodpeckers are expected to be nonexistent to negligible under the action alternative. Indirect effects to pileated woodpeckers are also expected to be negligible under this alternative. Pileated use of the project area is expected to be minimal due to the fire and due to the small amount of remaining un-burned habitat. Harvest would decrease snags, making for less potential foraging habitat in the short-term. As the stands regenerate and overstory canopy becomes closed again (50+ years), the snags retained in the proposed harvest units will either remain standing and be good nest trees or they will have fallen making coarse woody debris for foraging.

Cumulative Effects to Pileated Woodpeckers:

Effects of the No Action Alternative:

All potential pileated woodpecker foraging habitat on burned DNRC lands would be retained under this Alternative. The effects of the fire, however, severely reduced the amount of pileated nesting habitat in the cumulative effects analysis area, adding to the reduction in habitat caused by recent extensive logging on private timber lands in the area. Thus, the majority of the analysis area is not expected to support a substantial population of pileated woodpeckers over the next several decades, until forests begin to regenerate and the canopy closes once again.

Effects of the Action Alternative:

The effects of the fire severely reduced the amount of pileated nesting habitat in the cumulative effects analysis area, adding to the reduction in habitat caused by recent extensive logging on private timber lands in the area. Thus, the majority of the analysis area is not expected to support a substantial population of pileated woodpeckers over the next several decades. If pileated woodpeckers do nest in the appropriate unburned areas in the cumulative effects area, they may be able to use the burned acreages for foraging. Over time, the snags produced by the fire could become nest trees, once the stands regenerate a dense canopy. Harvest on DNRC lands within the analysis area (~3.5% of the area) would add to the removal of snags on other ownerships within the analysis area (potentially 50% of the area), potentially affecting the amount of foraging

habitat in the short-term. Minor cumulative reductions in foraging habitat could also occur over the longer term when harvested snags would otherwise have fallen, creating coarse woody debris feeding substrate on the ground. However, an appreciable portion of the analysis area is under USFS ownership and will likely remain unharvested (D. Wroblewski, pers. comm. Sept 2007), which would help ensure a broad diversity of coarse woody debris concentrations present over time at scales usable by pileated woodpeckers. As logged stands regenerate and overstory canopy becomes closed again (50+ years), the submerchantable and large snags required to be retained as mitigation in the proposed DNRC harvest units would remain standing and be good feeding and/or nest trees, or they will have fallen and will provide residual coarse woody debris for foraging. Given habitat was greatly compromised by the effects of the Chippy Creek wildfire, and that some snags and coarse woody debris would be retained in all harvest units, the cumulative effects associated with this Alternative are not expected to substantially affect pileated woodpeckers in the cumulative effects analysis area.

Mitigations for Pileated Woodpeckers:

- *Follow snag retention protocols set by ARM 36.11.411, retaining an average of at least 2 snags and 2 snag recruits >21" dbh (or the next largest size available) per acre of harvested land (or additional snags if snag recruits are not available)*
- *Favor ponderosa and larch, then Douglas-fir snags; favor clumping snags where possible, and retaining snags >200 yards from open roads*
- *Retain coarse woody debris where applicable (to provide foraging opportunities)*

➤ **Big Game**

Issue: Timber harvesting and related activities can affect big game wintering habitat and security.

Existing Environment:

The proposed project area lies within Hunting District 122, and within the Salish Elk Management Unit (MT FWP). High road densities within the hunting unit facilitate extensive hunter access. Timber harvesting can increase the vulnerability of elk and other big game by changing the size, structure, juxtaposition, and accessibility of areas that provide hiding cover and elk security during hunting season (Hillis et al. 1991). As visibility and accessibility increase within forested landscape, elk and deer have a greater probability of being observed and, subsequently, harvested by hunters.

Parts of the proposed project area also lie within the eastern edges of winter ranges for elk, white-tailed deer, and moose, as mapped by FWP. These winter ranges mostly comprise the lower elevation lands around the Thompson River. Characteristics of habitats that make them suitable for buffering the effects of severe winter conditions include having adequate midstory and overstory to reduce wind velocity and moderate ambient temperatures. Besides providing a moderated climate, the snow-intercept capacity effectively lowers snow depths, which enables big game movement and access to forage.

Past management activities in the lower elevations around the Thompson River valley have created a patchy landscape in terms of adequate cover for buffering winter conditions. The Chippy Creek Fire greatly increased the amount of open canopy,

decreasing the quality of winter range in the project area and surrounding lands. Likewise, vulnerability potential has increased due to the reduction in hiding cover and the increased accessibility to hunters and the lack of security cover (ie. relatively closed canopy forest in patches >250 acres) in the project area. Adequate hiding cover and winter-intercept cover still exist on unharvested, unburned acres within the project area (most of Section 6 and half of Section 20).

For this analysis, direct and indirect effects were considered in the project area. Cumulative effects of each alternative were considered in the area encompassed by all the drainages contributing to the Thompson River from Semem south to Sears Gulch (approx. 41,000 acres; see Figure W-1).

Direct and Indirect Effects on Big Game Winter Range and Security:

Effects of the No Action Alternative:

No salvage harvest would occur under this alternative, however, no cover suitable to provide security for big game or protection in winter is present in the proposed harvest areas. Thus, no effects to big game security or winter range would be anticipated under this alternative.

Effects of the Action Alternative:

No security cover, as defined by Hillis et. al 1991, currently exists in the project area due to existing open roads and due to the thinning effects of the fire. Although open road densities would not increase on DNRC lands under this Alternative, accessibility of the project area since the fire is greater than in the past, due to the lack of vegetation, especially on the flatter sections (6, 20, and 36). However, because little forage or cover exists on the project area, elk and other big game are not expected to use this area much during this hunting season. Winter range would not be affected by this Alternative, as the fire created poor cover conditions for these parts of the winter range. The removal of tree boles would slightly increase sight distances, resulting in slight increases in vulnerability of deer and elk to hunters. Any roads created under this alternative would be closed to vehicular traffic. Thus, direct and indirect effects to big game are expected to be negligible.

Cumulative Effects on Big Game Winter Ranges and Security:

Effects of the No Action Alternative:

Across the cumulative effects analysis area, the fire affected hiding cover for big game species on approximately 29,000 acres (70 %) and severely reduced the potential for security cover in the less roaded portions of the cumulative effects area (mostly on USFS lands). Security, hiding cover, and good quality winter range will be lacking across all of the burned lands, in addition to the lands in the analysis area that have received recent intensive harvests, for the next 10-20 years, at least until trees regenerate enough to provide cover.

Effects of the Action Alternative:

Under this alternative, dead trees would be removed from burned DNRC lands (<3%) of the cumulative effects analysis area. These actions would not appreciably decrease the amount or quality of winter range, hiding, or security cover in the proposed harvest units, nor across the cumulative effects analysis area. As discussed under the cumulative effects for the No Action alternative, the fire decreased the quality of big game habitat

across much of the cumulative effects analysis area, and any effects to visual cover or accessibility caused by the Action Alternative should be negligible in comparison to the effects of the fire.

Mitigations for Big Game:

- *Retain dense patches of conifer regeneration and shrubs where available and practicable.*
- *Close roads and skid trails opened with the proposed activities to reduce the potential for unauthorized motor vehicle use.*

LITERATURE CITED

- Aney, W. and R. McClelland. 1985. Pileated woodpecker habitat relationships (revised).
Pages 10-17 in Warren, N. eds. 1990. Old growth habitats and associated wildlife species in the Northern Rocky Mountains. USFS, Northern Region, Wildlife Habitat Relationships Program R1-90-42. 47 pp.
- Hejl, S. and M. McFadden. 1998. Maintaining fire-associated bird species across forest landscape in the Northern Rockies. Interim Report. USDA Forest Service, RMRS- Forestry Sciences Lab, Missoula, Montana. 15 pp.
- Hillis, J. M., M. J. Thompson, J. E. Canfield, L. J. Lyon, C. L. Marcum, P. M. Dolan, and D. W. McCleerey. 1991. Defining elk security: the Hillis paradigm. Pages 38-43 in A. G. Christensen, L. J. Lyon, and T. N. Lonner, comps., Proc. Elk Vulnerability Symp., Mont. State Univ., Bozeman, Montana. 330pp.
- Hutto, R. L. and S. M. Gallo. 2006. The effects of post-fire salvage logging on cavity-nesting birds. *The Condor* 108:817-831.
- Jones, J. L. 1991. Habitat use of fisher in north-central Idaho. M.S. Thesis, University of Idaho, Moscow, Idaho. 147 pp.
- Kotliar, N. B., S. J. Hejl, R. L. Hutto, V. A. Saab, C. P. Melcher, and M. E. McFadden. 2002. Effects of fire and post-fire salvage logging on avian communities in conifer-dominated forests of the western United States. *Studies in Avian Biology* 25:49-64.
- Losensky, B. J. 1997. Historical vegetation of Montana. DNRC Report, Missoula, Montana. 100 pp.
- McCallum, D. A. 1994. Review of technical knowledge: Flammulated Owls. Pp. 14-46 in Hayward, G.D. and J. Verner, eds. Flammulated, Boreal, and Great Gray Owls in the United States: A technical conservation assessment. USDA Forest Service GTR RM-253.
- Powell, R. A. and W. J. Zielinski. 1994. Fisher. Pages 38-73 in Ruggiero, L. F., K. B. Aubry, S. W. Buskirk, L. J. Lyon, and W. J. Zielinski, tech. eds. The scientific basis for conserving forest carnivores: American marten, fisher, lynx, and wolverine in the western United States. USDA Forest Service Gen. Tech. Rep. RM-254. Fort Collins, Colorado.
- Ruediger, B., J. Claar, S. Mighton, B. Naney, T. Tinaldi, F. Wahl, N. Warren, D. Wenger, A. Williamson, L. Lewis, B. Holt, G. Patton, J. Trick, A. Vandehey, and S. Gniadek. 2000. Canada Lynx Conservation Assessment (2nd Edition). USDA Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management, and USDI National Park Service. Missoula, Montana. 122 pp.
- Saab, V. R. Brannon, J. Dudley, L. Donohoo, D. Vanderzanden, Vi. Johnson, and H.

- Lachowski. 2002. Selection of Fire-created Snags at Two Spatial Scales by Cavity-nesting Birds. USDA Forest Service Gen. Tech. Rep. PSW-GTR-181.
- USFWS. 1987. Northern Rocky Mountain Wolf Recovery Plan. USFWS. Denver, Colorado. 119 pp.
- | USFWS. 1993. Grizzly Bear Recovery Plan. Missoula, Montana. 181 pp.
- Wittinger, W.T. 2002. Grizzly bear distribution outside of recovery zones. Unpublished memorandum by U.S. Department of Agriculture Forest Service, Region 1, Missoula, Montana. 2pp.

Figure W-1. Analysis areas used to evaluate cumulative effects of Alternatives to Big Game, Flammulated owls, Pileated woodpeckers, and Fishers.

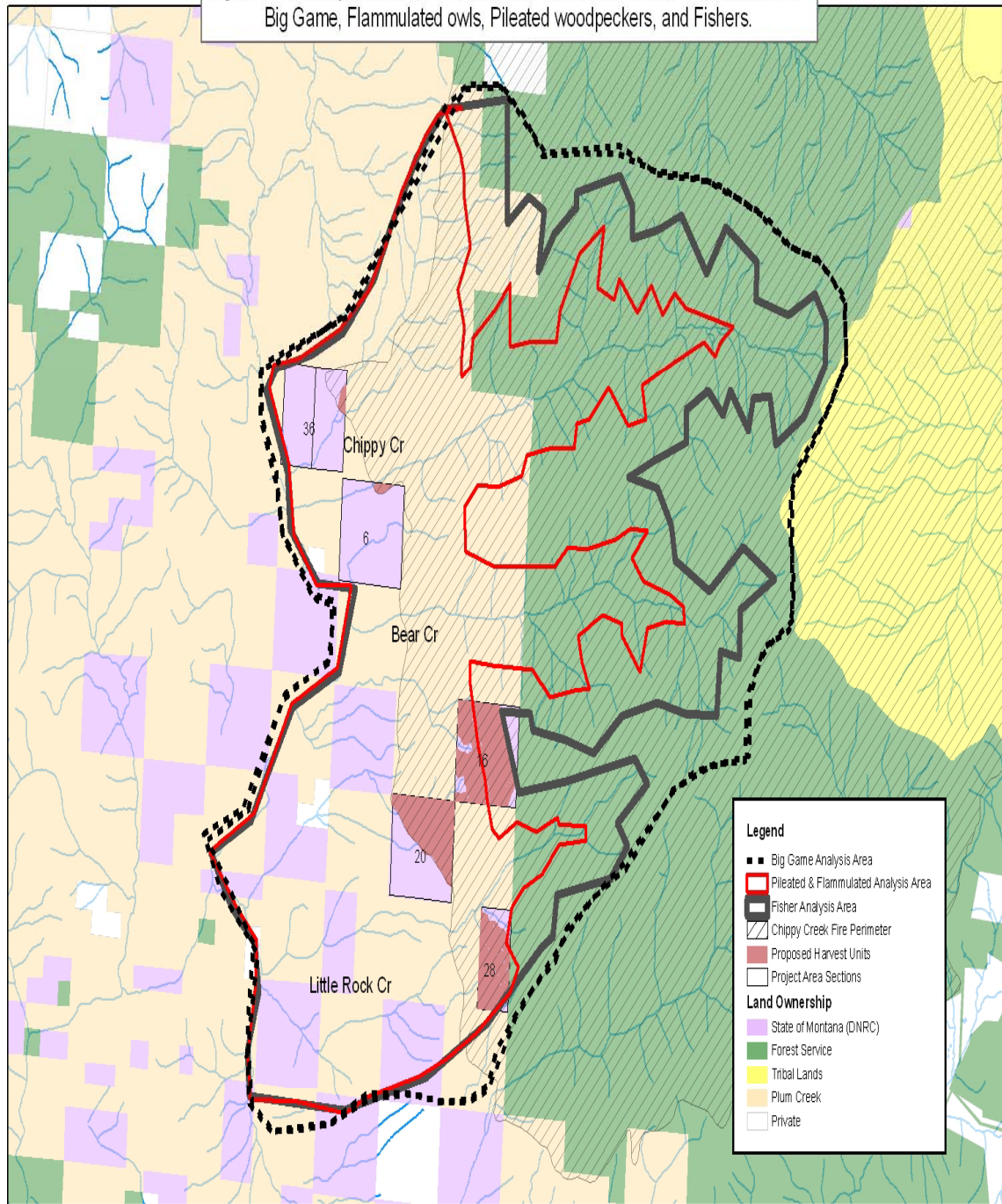
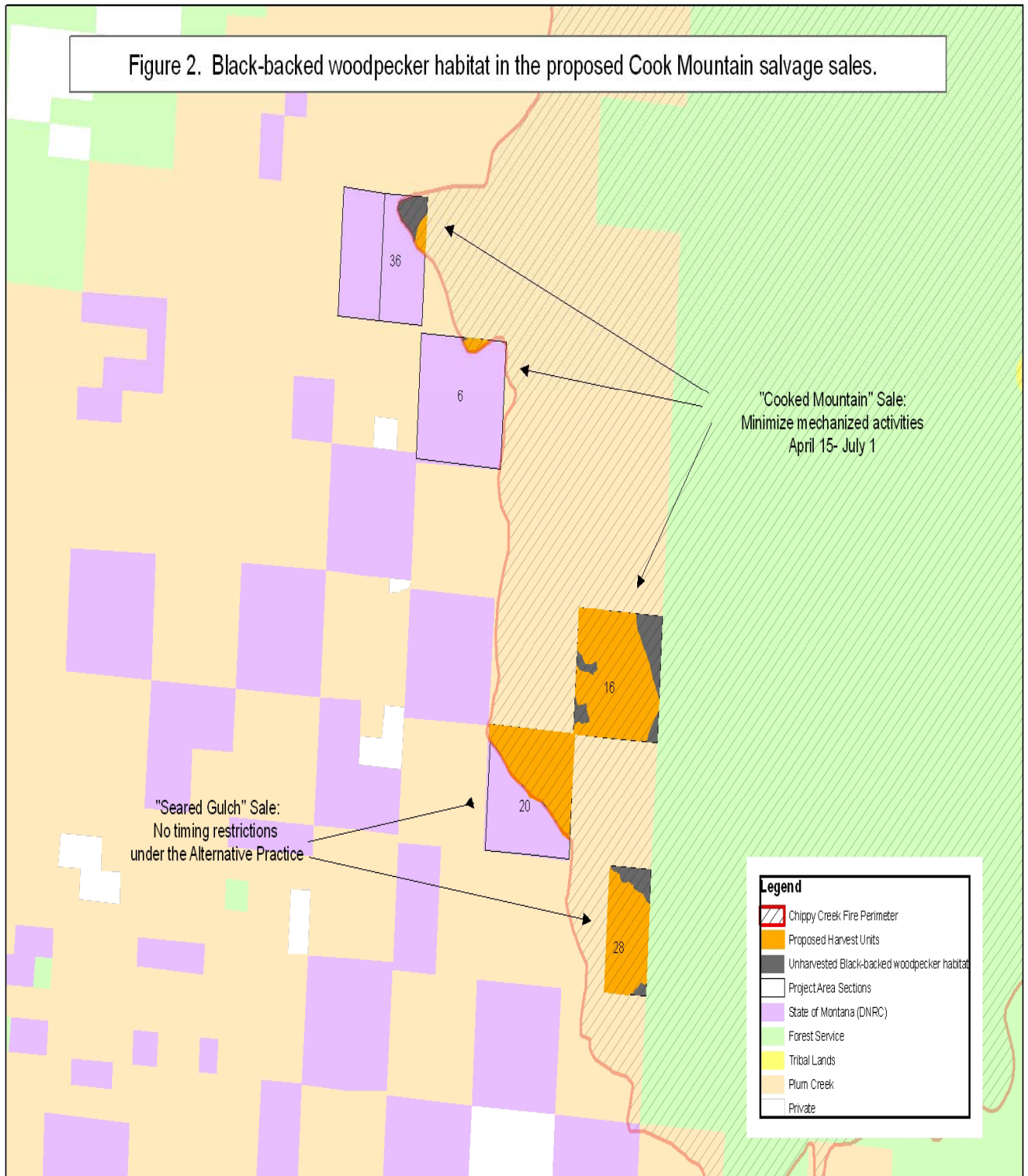


Figure 2. Black-backed woodpecker habitat in the proposed Cook Mountain salvage sales.



MEMORANDUM:

From: Rennie, Patrick

Sent: Wednesday, September 12, 2007 1:38 PM

To: Olsen, Dave

Subject: RE: Cook Mtn Salvage Rennie

I have consulted with the SHPO concerning this project and reviewed our in-house files. No cultural resources are known to exist within the proposed salvage area. No additional cultural resource investigative work is currently recommended.

Patrick

Attachment III

Prescriptions

Proposed Seared Gulch Salvage Timber Sale Harvest Unit Prescriptions

Harvest Unit: 20-1

Harvest Unit Acres: 315 acres

Location: Section 20, Township 23 North, Range 26 West

Elevation: 3600'

Slope: 5-40 %

Aspect: West to Southwest

Habitat Type: ABGR/CLUN, ABGR/LIBO, PSME/VACA, PSME/FESC, PSME/ARUV

Current Cover Type: ponderosa pine

Potential Vegetation Class: ponderosa pine

Soil Type: Combest gravelly silt loam, Winkler gravelly sandy loam, Mitten gravelly silt loam

Description of Existing Stand: This unit is located to the northeast of Road # 219 and is comprised of eleven identified stands in the Stand Level Inventory (SLI) in the northeast half of Section 20, Township 23 North, Range 26 West. The topography is rolling slopes ranging from 5-40 %. The section was selectively thinned and logged in 1993; the sale sold approximately 1,000 mbf of sawlog material. In the pre-fire condition of 2007, Douglas-fir, ponderosa pine and western larch dominated the overstory, with the understory consisting mainly of Douglas-fir, grand fir, scattered ponderosa pine and lodgepole pine. Post-fire activity of 2007 has left a large portion of the section with high tree mortality in all strata. The main road through the section, Martin Creek Road # 219, was used as the fireline for the Chippy Creek Fire. The fire burned intensely over approximately 275 acres of the 315 acre unit causing obvious high mortality in seedling, sapling, pole, and saw timber size classes, leaving no significant canopy cover. However, there are a few, scattered large-diameter ponderosa pine and western larch that appear to have survived the fire. The pine beetle (*Dendroctonus ponderosae*) and Red turpentine beetle (*Dendroctonus valens*) are already active in the black, fire stressed and dead ponderosa pine and lodgepole pine throughout the burned area. An exception to the intense fire is a portion of the northeast corner, about 40 acres, which mostly underburned with individual or small group torching. Most of the trees in this corner, in particular Douglas-fir, show evidence of bole scorching and damage to the root collar from the burning duff layer. The Douglas-fir and grand fir in this area are considered fire-stressed and susceptible to insect infestation such as the Douglas-fir beetle (*Dendroctonus pseudotsugae*) and the Fir engraver beetle (*Scolytus ventralis*).

Treatment Objectives:

- Remove merchantable fire-killed and stressed trees, along with mistletoe-infected western larch and Douglas-fir from the overstory to promote long-term forest health.
- Promote natural ponderosa pine and western larch regeneration in areas where a seed source exists.
- Retain adequate large-diameter snags, two to four per acre for wildlife habitat.

Prescribed Treatment:

- In areas of intense fire activity, salvage seed tree type harvest, retain snags at a variable spacing of 70-105 feet, leaving 4-6 trees per acre. Favor leaving ponderosa pine and western larch, then Douglas-fir snags in that order.
- Assess crown, cambium and root collar damage of any green-topped ponderosa pine and western larch, if any are found; retain them if they are disease free and have a high probability of survival.
- In areas of less- intense fire activity, selective thin, spacing out healthy trees with good crown and little bole scorching on a variable spacing of 35-45 feet, leaving 20-30 trees per acre. Favor leaving ponderosa pine and western larch, then Douglas-fir snags in that order. Do not leave mistletoe-infected western larch or Douglas-fir as leave trees.
- Retain at least two snags per acre >18" DBH and two snag recruits per acre to remain standing if they are not a safety hazard.

Harvest Method:

- Tractor logging with conventional, mechanical, or cut-to-length operations are applicable to this unit.
- Trees marked to leave. Cut tree mark on the boundary edges (+/-25 ft) of Type 1 & 2 SMZ's.

Hazard Reduction:

- Pile and burn slash at landings following harvest.
- Woody debris retention requirements of 10-15 tons per acre to encourage soil stability.

Regeneration/Site Preparation:

- Fire activity has provided scarification. Assess the need for and plant appropriate seedling species, such as western larch and ponderosa pine, where there is no seed source and soil conditions are favorable to planting.
- Retain standing, live and dead sub-merchantable trees where soil stability and safety concerns allow as for wildlife habitat.

Anticipated Future Treatments:

- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire, or other unanticipated circumstances on a case-by-case basis.
- This stand would be evaluated for regeneration and planting needs.
- This stand would be evaluated for regeneration and possible pre-commercial thinning opportunities as the stand progresses in age.

Harvest Unit: 28-T2**Harvest Unit Acres:** 33 acres**Location:** Section 28, Township 23 North, Range 26 West**Elevation:** 4480' – 5040' **Slope:** 20 - 55% **Aspect:** West**Habitat Type:** PSME/SYAL, PSME/CARU, ABGR/XETE**Current Cover Type:** ponderosa pine**Potential Vegetation Class:** ponderosa pine**Soil Type:** Mitten gravelly silt loam

Description of Existing Stand: This unit is located along the east line of Section 28, Township 23 North, Range 26 West. It is comprised of five (whole and partial) identified stands in the Stand Level Inventory (SLI). The topography is gentle to steeper slopes, mid-slope on the mountain ranging from 20 - 45%. This ½ section was last logged in 1945-1954 with conventional dozers and Idaho jammers, removing 2,315 mbf of ponderosa pine and 1,430 mbf of western larch/Douglas-fir. In the pre-fire condition of 2007, ponderosa pine, Douglas-fir, and smaller amounts of western larch dominated the overstory, with the understory consisting mainly of Douglas-fir, ponderosa pine and grand fir in the draws. A dozer line, used as the fireline for the Chippy Creek Fire, was constructed on the west section line. Through the majority of this unit, the fire burned intensely, causing obvious high mortality in seedling, sapling, pole, and saw timber size classes, leaving no significant canopy cover. There are scattered individual and clumps of large-diameter ponderosa pine and western larch that appear to have survived the fire. The pine beetle (*Dendroctonus ponderosae*) and Red turpentine beetle (*Dendroctonus valens*) are already active in the black, fire-stressed and dead ponderosa pine throughout the burned area. There are areas of less intense fire, which mostly under burned with individual or small group torching. Most of these trees, particularly Douglas-fir, show evidence of bole scorching and damage to the root collar from the burning duff layer. The Douglas-fir and grand fir in this area are considered fire-stressed and susceptible to insect infestation such as the Douglas-fir beetle (*Dendroctonus pseudotsugae*) and the Fir engraver beetle (*Scolytus ventralis*).

Treatment Objectives:

- Remove merchantable fire-killed and stressed trees, along with mistletoe-infected western larch and Douglas-fir from the overstory to promote long-term forest health.
- Retain seed trees and thin patches of timber that may have survived the recent fire that occurred in August of 2007.
- Promote natural ponderosa pine and western larch regeneration.

Prescribed Treatment:

- Seed tree harvest; spacing out healthy vigorous trees with good crown and bark characteristics that have survived the recent fire.
- Favor leaving ponderosa pine and mistletoe free western larch; then Douglas-fir.
- Variable spacing of 105-70 feet where possible, leaving approximately 2-4 TPA in areas of intense burning activity.
- Variable spacing greater than 6 TPA to promote natural clumps and to enhance the visual aesthetics, in areas of less intense fire activity.
- Retain a minimum of two snags per acre, 21" DBH & greater, and two snag recruits per acre, where present, if they are not a safety hazard. Favor ponderosa pine and western larch; then Douglas-fir.

Harvest Method:

- Trees marked to leave.
- Tractor logging with conventional, mechanical, or cut-to-length operations are applicable to this unit.

Hazard Reduction:

- Pile and burn at landings following harvest.
- Slash would be lopped and /or trampled to a depth of 18" or less. In openings where ponderosa pine regeneration is a primary goal, slash would be spot piled and burned.
- Woody debris retention requirements of 10-15 tons per acre to encourage soil stability.

Regeneration/Site Preparation:

- Fire activity has provided scarification. Assess the need for and plant appropriate seedling species, such as western larch and ponderosa pine, where there is no seed source and soil conditions are favorable to planting
- Retain standing, live and dead sub-merchantable trees where soil stability and safety concerns allow as for wildlife habitat.

Anticipated Future Treatments:

- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.
- This stand would be evaluated for regeneration and planted where no seed source exists.

Harvest Unit: 28-S1**Harvest Unit Acres:** 105 acres**Location:** Section 28, Township 23 North, Range 26 West**Elevation:** 3960' – 4880' **Slope:** 25 - 60% **Aspect:** West**Habitat Type:** ABGR/XETE, PSME/SYAL – CARU, PSME/CARU – ARUV**Current Cover Type:** ponderosa pine**Potential Vegetation Class:** ponderosa pine, western larch/Douglas-fir,**Soil Type:** Mitten gravelly silt loam, Sharrott, cool-Rock outcrop-Rubble land complex

Description of Existing Stand: This unit is located in the E1/2 SE1/4 and SE1/4 NE1/4 and NW1/4 NE1/4 of Section 28, Township 23 North, Range 26 West. It is comprised of six (whole and partial) identified stands in the Stand Level Inventory (SLI). The topography is west-facing slopes ranging from 25 - 60%. This ½ section was last logged in 1945-1954 with conventional dozers and Idaho jammers, removing 2,315 mbf of ponderosa pine and 1,430 mbf of western larch/Douglas-fir. In the pre-fire condition of 2007, ponderosa pine, Douglas-fir, and smaller amounts of western larch dominated the overstory, with the understory consisting mainly of Douglas-fir, ponderosa pine and grand fir in the draws. A dozer line, used as the fireline for the Chippy Creek Fire, was constructed on the west section line. Through the majority of this unit, the fire burned intensely, causing obvious high mortality in seedling, sapling, pole, and saw timber size classes, leaving no significant canopy cover. There are scattered individual and clumps of large-diameter ponderosa pine and western larch that appear to have survived the fire. The pine beetle (*Dendroctonus ponderosae*) and Red turpentine beetle (*Dendroctonus valens*) are already active in the black, fire-stressed and dead ponderosa pine throughout the burned area. There are areas of less intense fire, which mostly under burned with individual or small group torching. Most of these trees, in particular Douglas-fir, show evidence of bole scorching and damage to the root collar from the burning duff layer. The Douglas-fir and grand fir in this area are considered fire-stressed and susceptible to insect infestation such as the Douglas-fir beetle (*Dendroctonus pseudotsugae*) and the Fir engraver beetle (*Scolytus ventralis*).

Treatment Objectives:

- Remove merchantable fire-killed and stressed trees, along with mistletoe-infected western larch and Douglas-fir from the overstory to promote long-term forest health.
- Retain seed trees and thin patches of timber that may have survived the Chippy Creek fire that occurred in 2007.
- Promote natural ponderosa pine and western larch regeneration in the majority of the unit.

Prescribed Treatment:

- Seed Tree; spacing out healthy vigorous trees with good crown and bark characteristics that have survived the recent fire.
- Favor leaving ponderosa pine and mistletoe free western larch; then Douglas-fir.
- Variable spacing of 105-70 feet where possible, leaving approximately 2-4 TPA in areas of intense burning activity.
- Variable spacing greater than 6 TPA to promote natural clumps and to enhance the visual aesthetics, in areas of less intense fire activity.
- Retain a minimum of two snags per acre, 21" DBH & greater, and two snag recruits per acre, where present, if they are not a safety hazard. Favor ponderosa pine and western larch; then Douglas-fir.

Harvest Method:

- Line skidding operations are applicable to this unit.
- Trees marked to leave.

Hazard Reduction:

- Pile and burn at landings following harvest.
- Slash would be lopped to a depth of 18" or less.

Regeneration/Site Preparation:

- Fire activity has provided scarification. Assess the need for and plant appropriate seedling species, such as western larch and ponderosa pine, where there is no seed source and soil conditions are favorable to planting.
- Retain standing, live and dead sub-merchantable trees where soil stability and safety concerns allow as for wildlife habitat.

Anticipated Future Treatments:

- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.
- This stand would be evaluated for regeneration and possible precommercial thinning opportunities as the stand progresses in age.

Harvest Unit: 28-T1**Harvest Unit Acres:** 125 acres**Location:** Section 28, Township 23 North, Range 26 West**Elevation:** 3960' – 4380' **Slope:** 10 - 45% **Aspect:** West**Habitat Type:** PSME/VACA, ABGR/LIBO, PSME/SYAL, PSME/CARU**Current Cover Type:** ponderosa pine**Potential Vegetation Class:** ponderosa pine, western larch/Douglas-fir**Soil Type:** Mitten gravelly silt loam, Yourame gravelly loam

Description of Existing Stand: This unit is located in the W1/2 SE1/4 and SW1/4 NE1/4 of Section 28, Township 23 North, Range 26 West. It is comprised of seven (whole and partial) identified stands in the Stand Level Inventory (SLI). The topography is a gentle slope at the toe of the mountain ranging from 10 - 45%. This ½ section was last logged in 1945-1954 with conventional dozers and Idaho jammers, removing 2,315 mbf of ponderosa pine and 1,430 mbf of western larch/Douglas-fir. In the pre-fire condition of 2007, ponderosa pine, Douglas-fir, and smaller amounts of western larch dominated the overstory, with the understory consisting mainly of Douglas-fir, ponderosa pine and grand fir in the draws. A dozer line, used as the fireline for the Chippy Creek Fire, was constructed on the west section line. Through the majority of this unit the fire burned intensely, causing obvious high mortality in seedling, sapling, pole, and saw timber size classes, and leaving no significant canopy cover. There are scattered individual and clumps of large-diameter ponderosa pine and western larch that appear to have survived the fire. The pine beetle (*Dendroctonus ponderosae*) and Red turpentine beetle (*Dendroctonus valens*) are already active in the black, fire-stressed and dead ponderosa pine throughout the burned area. There are areas of less intense fire, which mostly under burned with individual or small group torching. Most of these trees, in particular Douglas-fir, show evidence of bole scorching and damage to the root collar from the burning duff layer. The Douglas-fir and grand fir in this area are considered fire stressed and susceptible to insect infestation such as the Douglas-fir beetle (*Dendroctonus pseudotsugae*) and the Fir engraver beetle (*Scolytus ventralis*).

Treatment Objectives:

- Salvage merchantable timber.
- Retain seed trees and thin patches of timber that may have survived the Chippy Creek Fire that occurred in 2007.
- Promote natural ponderosa pine and western larch regeneration in the majority of the unit.

Prescribed Treatment:

- Seed tree harvest; spacing out healthy vigorous trees with good crown and bark characteristics that have survived the recent fire.
- Favor leaving ponderosa pine and western larch; then Douglas-fir.
- Remove all other merchantable timber.
- Variable spacing of 105-70 feet where possible, leaving approximately 2-4 TPA in areas of intense burning activity.
- Variable spacing greater than 6 TPA to promote natural clumps and to enhance the visual aesthetics, in areas of less intense fire activity.
- Retain a minimum of two snags per acre, 21" DBH & greater, and two snag recruits per acre, where present, if they are not a safety hazard. Favor ponderosa pine and western larch; then Douglas-fir.

Harvest Method:

- Trees marked to leave.
- Tractor logging with conventional, mechanical, or cut-to-length operations are applicable to this unit.

Hazard Reduction:

- Pile and burn at landings following harvest.
- Slash would be lopped and /or trampled to a depth of 18" or less. In openings where ponderosa pine regeneration is a primary goal, slash would be spot piled and burned.
- Machine pile and burn all slash in excess of retention requirements of 5 to 10 tons per acre on areas accessible to excavator.

Regeneration/Site Preparation:

- Fire activity has provided scarification. Assess the need for and plant appropriate seedling species, such as western larch and ponderosa pine, where there is no seed source and soil conditions are favorable to planting
- Retain standing, live and dead sub-merchantable trees where soil stability and safety concerns allow as for wildlife habitat.

Anticipated Future Treatments:

- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.
- This stand would be evaluated for regeneration and possible precommercial thinning opportunities as the stand progresses in age.

Cooked Mountain Salvage **Proposed Harvest Prescriptions**

Harvest Unit: 16-1

Harvest Unit Acres: 265 acres

Location: Section 16, Township 23 North, Range 26 West

Elevation: 5000' – 6200'

Slope: 45 – 55%

Aspect: West

Habitat Type: PSME/CARU; PSME/VAGL

Current Cover Type: Douglas-fir; ponderosa pine; western larch / Douglas-fir

Potential Vegetation Class: Douglas-fir; ponderosa pine; western larch / Douglas-fir

Soil Type: Mitten Gravely Silt Loam.

Description of Existing Stand:

This unit is located in the east half of Section 16, T23N, R26W, east of the Cook Mountain Road. It is comprised of fifteen (full or partial) stands identified in the Stand Level Inventory (SLI). The topography is sloped, ranging from 40-55 %. The section was selectively thinned and logged in 1999; the sale sold approximately 1,000 mbf of sawlog material. In the pre-fire condition of 2007, Douglas-fir dominated the overstory, with a few scattered ponderosa pine and western larch, the understory consisting mainly of Douglas-fir. Both the overstory and understory Douglas-fir was heavily infested with dwarf mistletoe. The unit was burned during the Chippy Creek Fire. Post-fire conditions show high tree mortality in all strata. The fire intensity was varied, and there is evidence of crown runs, individual and group torching throughout the northern half of the unit. Throughout the underburned portion of the unit, most trees, particularly Douglas-fir, show evidence of bole scorching on an average of 35-40 feet, as well as damage to the root collar. The Douglas-fir in this area are considered fire-stressed and susceptible to insect infestation such as the Douglas-fir beetle (*Dendroctonus pseudotsugae*). The southern half of the unit burned the most intensely, with obvious high mortality in seedling, sapling, pole, and saw timber size classes, and left no significant canopy cover. Most downed woody debris was consumed.

Treatment Objectives:

- Remove fire scorched and diseased Douglas-fir from the overstory to promote long-term forest health.
- Promote ponderosa pine and western larch regeneration in areas where a seed source exists.
- Retain adequate large-diameter snags, two to four per acre for wildlife habitat.

Prescribed Treatment:

- Species designated cut tree Douglas-fir along with mistletoe-infected western larch.
- Seed tree harvest. Remove all merchantable Douglas-fir.
- Leave 2 or 3 mistletoe-free Douglas-fir greater than 18" DBH, or of the largest size class available, per acre, if no ponderosa pine or western larch are available.
- Leave all live or dead ponderosa pine and mistletoe-free western larch.
- Retain standing, live and dead sub-merchantable trees where soil stability and safety concerns allow as for wildlife habitat.
- Retain at least two snags per acres >18" DBH and two snag recruits per acre to remain standing if they are not a safety hazard.

Harvest Method:

- Line skidding with conventional, mechanical (<50% slope), or cut-to-length operations are applicable to this unit.
- Use existing corridors for mechanical falling and line skidding as much as possible.

Hazard Reduction:

- Pile and burn slash at landings.
- Woody debris retention requirements of 10-15 tons per acre to encourage soil stability.

Regeneration / Site Preparation:

- Fire activity has provided scarification. Assess the need for and plant appropriate seedling species, such as western larch and ponderosa pine, where there is no seed source and soil conditions are favorable to planting.
- Retain standing, live and dead sub-merchantable trees, where soil stability and safety concerns allow, to provide for wildlife habitat.

Anticipated Future Treatments:

- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, or other unanticipated circumstances on a case by case basis.
- This stand would be evaluated for regeneration and planting needs.
- This stand would be evaluated for regeneration and possible pre-commercial thinning opportunities as the stand progresses in age.

Harvest Unit: 16-2

Harvest Unit Acres: 177 acres

Location: Section 16, Township 23 North, Range 26 West

Elevation: 4400' – 5000'

Slope: 45 – 55%

Aspect: West

Habitat Type: PSME/CARU, PSME/VACA.

Current Cover Type: ponderosa pine; western larch / Douglas-fir

Potential Vegetation Class: ponderosa pine; western larch / Douglas-fir

Soil Type: Mitten Gravelly Silt Loam.

Description of Existing Stand:

This unit is located in the west half of Section 16, T23N, R26W, west of Cook Mountain Road. It is comprised of fourteen (full or partial stands) identified in the Stand Level Inventory (SLI). The topography is sloped, ranging from 40-55 %. The northwest half of the unit was selectively thinned and logged in 1999; the sale sold approximately 1,000 mbf of sawlog material. In the pre-fire condition of 2007, Douglas-fir dominated the overstory, with a few scattered ponderosa pine and western larch, the understory consisted mainly of Douglas-fir. Overstory tree diameters ranged from 10" to 18" with scattered individuals >25". Tree heights ranged from 55' to 75', averaging 65'. Both the overstory and understory Douglas-fir were heavily infested with dwarf mistletoe. The unit was burned as a result of the Chippy Creek Fire. Fire intensity was varied, and there is evidence of crown runs, individual and group torching throughout the unit. The northern and west portions of the unit were mostly moderate intensity underburn. The southern half of the unit burned most intensely, with obvious high mortality in seedling, sapling, pole, and saw timber size classes, and left no significant canopy cover. Most downed woody debris was consumed. The pine beetle (*Dendroctonus ponderosae*) and Red turpentine beetle (*Dendroctonus valens*) are already active in the black, fire-stressed and dead ponderosa pine throughout the unit.

Treatment Objectives:

- Remove merchantable fire-killed and stressed trees, along with mistletoe-infected western larch and Douglas-fir from the overstory to promote long-term forest health.
- Promote ponderosa pine and western larch regeneration in areas where a seed source exists.
- Retain adequate large-diameter snags, two to four per acre for wildlife habitat.

Prescribed Treatment:

- Leave tree marking. Salvage/seed tree harvest; retain snags at a variable spacing of 70-105 feet, leaving 4-6 trees per acre. Favor leaving ponderosa pine and western larch, then Douglas-fir snags in that order. Do not leave mistletoe-infected western larch or Douglas-fir as leave trees.

- Assess crown, cambium and root collar damage of any green topped ponderosa pine and western larch, if any are found; retain them if they are disease free and have a high probability of survival.
- Retain at least two snags and two snag recruits per acre of the largest size class as available.
- Retain standing, live and dead sub-merchantable trees, where soil stability and safety concerns allow, to provide wildlife habitat.

Harvest Method:

- Line skidding with conventional, mechanical (<50% slope), or cut-to-length operations are applicable to this unit.
- Use existing corridors for mechanical falling and line skidding as much as possible.
- Leave tree mark for snag retention, western larch, ponderosa pine and Douglas-fir, with preference in that order.

Hazard Reduction:

- Pile and burn slash at landings.
- Woody debris retention requirements of 10-15 tons per acre to encourage soil stability.

Regeneration / Site Preparation:

- Fire activity has provided scarification. Assess the need for and plant appropriate seedling species, such as western larch and ponderosa pine, where there is no seed source and soil conditions are favorable to planting
- Success of natural regeneration should be evaluated in approximately 5 years.

Anticipated Future Treatments:

- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, or other unanticipated circumstances on a case by case basis.
- This stand would be evaluated for regeneration and possible pre-commercial thinning opportunities as the stand progresses in age.

Harvest Unit: 16-3

Harvest Unit Acres: 23 acres

Location: Section 16, Township 23 North, Range 26 West

Elevation: 5000' – 6200'

Slope: 30-45%

Aspect: West

Habitat Type: PSME/VAGL

Current Cover Type: western larch / Douglas-fir.

Potential Vegetation Class: western larch / Douglas-fir.

Soil Type: Mitten Gravelly Silt Loam.

Description of Existing Stand:

This unit is located in the south east quarter of Section 16, T23N, R26W, south of Cook Mountain Road. It is comprised of two (full or partial) stands identified in the Stand Level Inventory (SLI). The topography is sloped, ranging from 40-55 %. The northeast half of the unit was selectively thinned and logged in 1999; the sale sold approximately 1,000 mbf of sawlog material. Douglas-fir was the dominant species in the unit with scattered ponderosa pine and western larch. The overstory and understory Douglas-fir was heavily infested with dwarf mistletoe. Overstory diameters average 17" and range from 12-20". Tree heights average 75' and range from 65' to 85'. The entirety of the unit was burned intensely, causing obvious high mortality in seedling, sapling, pole, and saw timber size classes, and left no significant canopy cover. The understory and down woody material was consumed by the flames. The pine beetle (*Dendroctonus ponderosae*) and Red turpentine beetle (*Dendroctonus valens*) are already active in the black, fire stressed and dead ponderosa pine throughout the burned area.

Treatment Objectives:

- Remove merchantable fire-killed and stressed trees, along with mistletoe-infested western larch and Douglas-fir from the overstory to promote long-term forest health.
- Promote ponderosa pine and western larch regeneration.
- Retain adequate large-diameter snags, two to four per acre for wildlife habitat.

Prescribed Treatment:

- Leave tree marking. Salvage/seed tree harvest; retain snags at a variable spacing of 70-105 feet, leaving 2-4 trees per acre. Favor leaving ponderosa pine and western larch, then Douglas-fir snags in that order. Do not leave mistletoe-infested western larch or Douglas-fir as leave trees.
- Retain at least two snags per acres >18" DBH per acre to remain standing if they are not a safety hazard.
- Retain standing, live and dead sub-merchantable trees, where soil stability and safety concerns allow, to provide for wildlife habitat.

Harvest Method:

- Ground-based harvesting operations are applicable to this unit.
- Maintain tread of existing Trail # 291T
- Leave tree mark for snag retention, western larch, ponderosa pine and Douglas-fir, with preference in that order.

Hazard Reduction:

- Pile and burn slash at landings.
- Woody debris retention requirements of 10-15 tons per acre to encourage soil stability.

Regeneration / Site Preparation:

- Fire activity has provided scarification. Assess the need for and plant appropriate seedling species, such as western larch and ponderosa pine, where there is no seed source and soil conditions are favorable to planting
- Success of natural regeneration should be evaluated in approximately 5 years.

Anticipated Future Treatments:

- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, or other unanticipated circumstances on a case by case basis.
- This stand would be evaluated for regeneration and possible pre-commercial thinning opportunities as the stand progresses in age.

Harvest Unit: 16-4

Harvest Unit Acres: 33 acres

Location: Section 16, Township 23 North, Range 26 West

Elevation: 4200' – 4600'

Slope: 20-45%

Aspect: West

Habitat Type: PSME/CARU

Current Cover Type: ponderosa pine; Douglas-fir

Potential Vegetation Class: ponderosa pine; Douglas-fir

Soil Type: Mitten Gravelly Silt Loam.

Description of Existing Stand:

This unit is located in the south west quarter of Section 16, T23N, R26W. It is comprised of three (full or partial) stands identified in the Stand Level Inventory (SLI). The topography is sloped, ranging from 40-55 %. The unit was selectively thinned and logged

in 1999; the sale sold approximately 1,000 mbf of sawlog material. The unit was burned during the Chippy Creek Fire. Fire activity was a moderately intense underburn, and there is evidence of crown runs, individual and group torching throughout the unit. The underburn killed the majority of the existing understory, mistletoe-infected Douglas-fir along with the healthy ponderosa pine regeneration. Ponderosa pine and Douglas-fir are the dominant species in the overstory, with scattered western larch. The overstory Douglas-fir was heavily infested with dwarf mistletoe. Overstory tree diameters average 13" and range from 10 – 18" with scattered large diameter trees. Tree heights range from 50 – 80' and average 65'. The pine beetle (*Dendroctonus ponderosae*) and Red turpentine beetle (*Dendroctonus valens*) are already active in the black, fire stressed and dead ponderosa pine throughout the burned area.

Treatment Objectives:

- Remove merchantable fire-killed and stressed trees, along with mistletoe-infected western larch and Douglas-fir from the overstory to promote long-term forest health.
- Promote ponderosa pine and western larch regeneration in areas where a seed source exists.
- Retain adequate large diameter snags, two to four per acre for wildlife habitat.

Prescribed Treatment:

- Leave tree marking. Salvage/seed tree harvest; retain snags at a variable spacing of 70-105 feet, leaving 4-6 trees per acre. Favor leaving ponderosa pine and western larch, then Douglas-fir snags in that order. Do not leave mistletoe-infected western larch or Douglas-fir as leave trees.
- Assess crown, cambium and root collar damage of any green topped ponderosa pine and western larch, if any are found; retain them if they are disease free and have a high probability of survival.
- Leave tree mark for snag retention, western larch, ponderosa pine and Douglas-fir, with preference in that order.
- Retain standing, live and dead sub-merchantable trees where soil stability and safety concerns allow as for wildlife habitat.

Harvest Method:

- Ground-based harvesting operations are applicable to this unit.
- Western larch, ponderosa pine, and Douglas-fir: leave tree marked, with preference in that order.

Hazard Reduction:

- Pile and burn slash at landings.
- Woody debris retention requirements of 10-15 tons per acre to encourage soil stability.

Regeneration / Site Preparation:

- Success of natural regeneration should be evaluated in approximately 5 years.
- Fire activity has provided scarification. Assess the need for and plant appropriate seedling species, such as western larch and ponderosa pine, where there is no seed source and soil conditions are favorable to planting

Anticipated Future Treatments:

- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, or other unanticipated circumstances on a case by case basis.
- This stand would be evaluated for regeneration and possible pre-commercial thinning opportunities as the stand progresses in age.

Harvest Unit: 16-5**Harvest Unit Acres:** 13 acres**Location:** Section 16, Township 23 North, Range 26 West**Elevation:** 4200' – 4400'**Slope:** 20-45%**Aspect:** West**Habitat Type:** PSME/VACA**Current Cover Type:** ponderosa pine**Potential Vegetation Class:** ponderosa pine**Soil Type:** Mitten Gravely Silt Loam.**Description of Existing Stand:**

This unit is located in the southwest quarter of Section 16, T23N, R26W. It is comprised of two (full or partial) stands identified in the Stand Level Inventory (SLI). The topography is sloped, ranging from 40-55 %. The northeast half of the unit was selectively thinned and logged in 1999; the sale sold approximately 1,000 mbf of sawlog material. The unit was burned as a result of the Chippy Creek Fire. Fire intensity was mostly moderate intensity underburn., and there is evidence of crown runs, individual and group torching throughout the unit, with obvious mortality in seedling, sapling, pole, and saw timber size classes. Down woody debris loadings are varied up to approximately 5 -10 tons/ac. Ponderosa pine and Douglas-fir are the dominant species in the overstory, with scattered western larch. Overstory tree diameters average 12" and range from 10 – 16" with scattered large-diameter trees. Tree heights range from 55' to 75' and average 65'. Prior to the fire, the Douglas-fir was heavily infested with dwarf mistletoe. The pine beetle (*Dendroctonus ponderosae*) and Red turpentine beetle (*Dendroctonus valens*) are already active in the black, fire stressed and dead ponderosa pine and lodgepole pine throughout the burned area.

Treatment Objectives:

- Remove merchantable fire-killed and stressed trees, along with mistletoe-infected western larch and Douglas-fir from the overstory to promote long-term forest health.
- Promote ponderosa pine and western larch regeneration in areas where a seed source exists.
- Retain adequate large diameter snags, two to four per acre for wildlife habitat.

Prescribed Treatment:

- Leave tree marking. Salvage/seed tree harvest, retain snags at a variable spacing of 70-105 feet, leaving 4-6 trees per acre. Favor leaving ponderosa pine and western larch, then Douglas-fir snags in that order. Do not leave mistletoe-infected western larch or Douglas-fir as leave trees.
- Assess crown, cambium and root collar damage of any green topped ponderosa pine and western larch, if any are found; retain them if they are disease free and have a high probability of survival.
- Retain at least two snags per acres >18" DBH and two snag recruits per acre to remain standing if they are not a safety hazard.
- Retain standing, live and dead sub-merchantable trees where soil stability and safety concerns allow as for wildlife habitat.

Harvest Method:

- Ground-based harvesting operations are applicable to this unit.
- Ponderosa pine, western larch, and Douglas-fir: leave tree marked, with preference in that order.

Hazard Reduction:

- Pile and burn slash at landings.
- Woody debris retention requirements of 10-15 tons per acre to encourage soil stability.

Regeneration / Site Preparation:

- Success of natural regeneration should be evaluated in approximately 5 years.
- Planting of ponderosa pine is recommended if natural regeneration is not successful.

Anticipated Future Treatments:

- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, or other unanticipated circumstances on a case by case basis.
- This stand would be evaluated for regeneration and possible pre-commercial thinning opportunities as the stand progresses in age.

Harvest Unit: 6-1

Harvest Unit Acres: 26

Location: Section 6, Township 23 North, Range 26 West

Elevation: 3000' - 3200'

Slope: 0-70 %

Aspect: West

Habitat Type: PSME/VACA, PSME/SYAL

Current Cover Type: ponderosa pine, mixed conifer, western larch/Douglas-fir

Potential Vegetation Class: ponderosa pine, mixed conifer, western larch/Douglas-fir

Soil Type: Mitten Gravely Silt Loam.

Description of Existing Stand:

This unit is located in the northeast quarter of the Section 6, T23N, R26W. It is comprised of four (partial) stands identified in the Stand Level Inventory (SLI). The topography varies from flat (0-10 %) to sloped ranging from 60-70 % in the Streamside Management Zone (SMZ). The section was selectively thinned and logged in 1999; the sale sold approximately 1,000 mbf of sawlog material. The SMZ portion of this unit, approximately 6 acres, was not included in the 1999 Cook-Bear Timber Sale. The unit was burned during the Chippy Creek Fire. The fire burned intensely through the Chippy Creek SMZ causing obvious high mortality in seedling, sapling, pole, and saw timber size classes, leaving no significant canopy cover. Down woody debris was mostly consumed. Ponderosa pine and Douglas-fir are the dominant species in the overstory, with a few scattered western larch. The understory consisted mainly of Douglas-fir, ponderosa pine and lodgepole pine. The pine beetle (*Dendroctonus ponderosae*) and Red turpentine beetle (*Dendroctonus valens*) are already active in the black, fire stressed and dead ponderosa pine throughout the burned area.

Treatment Objectives:

- Remove merchantable fire-killed and stressed trees to promote long-term forest health.
- Promote natural ponderosa pine and western larch regeneration in areas where a seed source exists.
- Retain adequate large-diameter snags, two to four per acre for wildlife habitat.

Prescribed Treatment:

- Seed tree harvest. Remove merchantable fire-killed and stressed trees, along with mistletoe-infected western larch and Douglas-fir from the overstory to promote long-term forest health. Retain at least two snags per acres >18" DBH and two snag recruits per acre to remain standing if they are not a safety hazard.
- Maintain a 66-foot no-cut buffer zone from the toe of the slope along Chippy Creek
- Retain at least two snags per acres >18" DBH and two snag recruits per acre to remain standing if they are not a safety hazard.

- Retain standing, live and dead sub-merchantable trees where soil stability and safety concerns allow as for wildlife habitat.

Harvest Method:

- Combination of cable and ground-based harvesting operations are applicable to this unit.
- Cut-to-length logging operations required in the SMZ. “One-end” suspension required for line skidding in the SMZ. Leave slash/tops lopped to a depth of 18” or less for downed woody debris retention and to provide for soil stability.
- Leave tree mark for snag retention, western larch, ponderosa pine and Douglas-fir, with preference in that order.

Hazard Reduction:

- Pile and burn slash at landings.
- Woody debris retention requirements of 15-20 tons per acre to encourage soil stability.

Regeneration / Site Preparation:

- Success of natural regeneration should be evaluated in approximately 5 years.
- Fire activity has provided scarification. Assess the need for and plant appropriate seedling species, such as western larch and ponderosa pine, where there is no seed source and soil conditions are favorable to planting

Anticipated Future Treatments:

- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, or other unanticipated circumstances on a case by case basis.
- This stand would be evaluated for regeneration and possible pre-commercial thinning opportunities as the stand progresses in age.

Harvest Unit: 36-1

Harvest Unit Acres: 13

Location: Section 36, Township 24 North, Range 27 West

Elevation: 4200' – 4400'

Slope: 20-45%

Aspect: West

Habitat Type: PSME/VACA

Current Cover Type: ponderosa pine

Potential Vegetation Class: ponderosa pine

Soil Type: Mitten Gravelly Silt Loam.

Description of Existing Stand:

This unit is located in the southwest quarter of Section 36, T24N, R27W. It is comprised of two partial stands identified in the Stand Level Inventory (SLI). The topography varies from flat (0-10 %) to sloped ranging from 45-60 % in the Streamside Management Zone (SMZ). The unit was not included in the Big Prairie Timber Sale in 2007. The unit was burned during the Chippy Creek Fire. The Semem Creek SMZ was burned intensely throughout causing obvious high mortality in seedling, sapling, pole, and saw timber size classes, leaving no significant canopy cover. The understory and down woody material was consumed by the flames. The pine beetle (*Dendroctonus ponderosae*) and Red turpentine beetle (*Dendroctonus valens*) are already active in the black, fire stressed and dead ponderosa pine throughout the burned area. Douglas-fir is the dominant species in the overstory, with a few scattered ponderosa pine and western larch. The understory consisted mainly of grand fir and Douglas-fir. The pine beetle (*Dendroctonus ponderosae*) and Red turpentine beetle (*Dendroctonus valens*) are already active in the black, fire stressed and dead ponderosa pine throughout the burned area.

Treatment Objectives:

- Remove merchantable fire-killed and stressed trees to promote long-term forest health.
- Promote natural ponderosa pine and western larch regeneration in areas where a seed source exists.
- Retain adequate large-diameter snags, two to four per acre for wildlife habitat.

Prescribed Treatment:

- Seed tree harvest. Remove merchantable fire-killed and stressed trees, along with mistletoe-infected western larch and Douglas-fir from the overstory to promote long-term forest health. Retain at least two snags per acres >18" DBH and two snag recruits per acre to remain standing if they are not a safety hazard.
- Maintain a 66-foot no-cut buffer from the stream edge on Semem Creek. Retain standing, live and dead sub-merchantable trees where soil stability and safety concerns allow as for wildlife habitat.

Harvest Method:

- Combination of cable and ground-based harvesting operations are applicable to this unit.
- Cut-to-length logging operations required in the SMZ. Full suspension required for line skidding across the SMZ. Leave slash/tops lopped to a depth of 18" or less for downed woody debris retention and to provide for soil stability.
- Leave tree mark for snag retention, western larch, ponderosa pine and Douglas-fir, with preference in that order.

Hazard Reduction:

- Pile and burn slash at landings.
- Woody debris retention requirements of 15-20 tons per acre to encourage soil stability.

Regeneration / Site Preparation:

- Success of natural regeneration should be evaluated in approximately 5 years.
- Fire activity has provided scarification. Assess the need for and plant appropriate seedling species, such as western larch and ponderosa pine, where there is no seed source and soil conditions are favorable to planting
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Anticipated Future Treatments:

- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, or other unanticipated circumstances on a case by case basis.
- This stand would be evaluated for regeneration and possible pre-commercial thinning opportunities as the stand progresses in age.

Attachment IV

Mitigations

Mitigation Measures

Roads: A transportation system minimizing road miles and meeting all BMP's has been designed by DNRC. Roads constructed in association with this project total 6 miles, and would remain in place following the completion of this project. After activities have been completed, the roads would be grass seeded and closed to public use. There would be reconstruction and improvement totaling 2.5 miles, involving road surface drainage and opening roads for safe hauling traffic. There would be approximately 1.5 miles of road that would be permanently closed or reclaimed. Upon completion of roadwork, all haul roads would meet Best Management Practices (BMP's) standards.

Wildlife: The following issues have been identified, with mitigation measures (*italicized*) incorporated into the proposed project.

Gray Wolf: Suspend operations and temporarily restrict use of roads within a 1-mile radius of any known active wolf den. Suspend operations and consult a DNRC biologist if a suspected rendezvous site is observed within 0.5 miles of any ongoing project activities. Close unnecessary roads and skid trails after the proposed activities to reduce the potential for motor vehicle disturbance. Use a combination of topography, group retention, and roadside vegetation buffers, to reduce views into harvest units along open roads. *These items would be specified in the Timber Sale Contract and monitored by the Forest Officer.*

Pileated Woodpecker: Favor western larch and Ponderosa pine in retention and regeneration decisions. *Harvest and stand prescriptions accomplish this. Reduce motorized access to reduce potential loss of existing snags to firewood gathering.* Manage for snags, snag recruits, and coarse woody debris according to ARM 36.11.411, 16.11.413, and 36.11.414, particularly favoring western larch and ponderosa pine. *Contract provisions would be in place to accomplish this.*

Flammulated Owl: Favor ponderosa pine in retention and regeneration decisions. Restrict public access to reduce potential loss to firewood gathering. Manage for large-sized snags and snag recruits according to ARM 36.11.411, particularly favoring ponderosa pine. *Mitigation identical to those above under "Pileated Woodpecker".*

Big Game Winter Range: Retain patches of dense vegetation, if available, in harvest units within winter range when possible to provide thermal cover/snow intercept capacity. *Harvest unit and stand prescriptions will accomplish this.* Close roads and skid trails opened with the proposed activities to reduce the potential for disturbance from unauthorized motor vehicle traffic.

Black Back Woodpeckers: Retain at least 10% of the burned acreage on DNRC lands in an unharvested condition that is broadly representative of the entire burn and in relatively contiguous blocks, favoring close proximity to unharvested fire-killed deferred stands on neighboring ownerships. Follow snag retention protocols and recommendations discussed elsewhere. Minimize mechanized activity within 0.25 mi of BBWO reserved habitat from April 15 through July 1

Elk Security: Close roads and skid trails opened with the proposed activities to reduce the potential for disturbance from unauthorized motor vehicle traffic.

Fisher: Give consideration to maintaining an abundance of large snags and coarse woody debris within 100 ft of Class 1 streams, following SMZ mitigations discussed elsewhere. Follow snag retention protocols and recommendations discussed elsewhere. *Harvest unit and stand prescriptions will accomplish this.* Close roads and skid trails opened with the proposed activities to reduce the potential for unauthorized motor vehicle use

Soils: Limit equipment operations to periods when soils are relatively dry, (less than 20% soil moisture content), frozen or snow covered to minimize soil compaction and rutting, and maintain drainage features. Check soil moisture conditions prior to equipment start-up. On ground skidding units, the logger and sale administrator would agree to a general skidding plan prior to equipment operations. Skid trail planning would identify which main trails to use, and what additional trails may be needed. Trails that do not comply with BMP's (i.e. draw bottom trails) would not be used and would be closed with additional drainage installed where needed or grass seeded to stabilize the site and control erosion. Tractor skidding would be limited to slopes less than 45%. On line skid units, with mechanical option falling, use existing corridors for machine travel and line skidding operations. Short steep slopes above incised draws may require a combination of mitigation measures based on site review, such as adverse skidding to ridge or winch line skidding from more moderate slopes less than 40%. Consider lop and scatter or jackpot burning on steeper slopes. In areas of moderate to high burn severity, contour fall 5-10 sub-merchantable trees per acre to limit soil disturbance, promote nutrient cycling and moisture retention. Retain 10-15 tons/acre large woody debris and a majority of all fine litter feasible following harvest (ARM 36.11.410 and 36.11.414).

Regeneration: Plant seedlings of the desired future condition species where soil condition allows and there is little or no seed source.

Hydrology: All forestry Best Management Practices (BMP's) would apply to limit the potential for sediment delivery to dry draws and swales. This would further limit the potential for sediment introduction.

Weed Management: Roads and skid trail approaches would be seeded and spot treated with chemicals following construction and project completion. Prior to entering site, off-road equipment would be cleaned and inspected through the timber sale contract to avoid seed migration.

Attachment 5

Consultants and References

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References

- Forestry Best Management Practices.
- DNRC, 1996. State Forest Management Plan. Montana DNRC, Forest Management Bureau. Missoula, MT.
- Green, P., J. Joy, D. Sirucek, W. Hann, A. Zack, and B. Naumann. 1992. Old-growth forest types of the Northern Region. USDA Forest Service, Northern region. Missoula, Montana.
- Losensky, J. 1997. Historical Vegetation of Montana. Contact #970900. Montana DNRC. Missoula, MT. 109pp.